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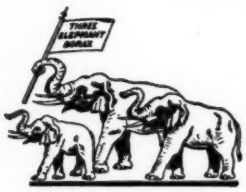

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Better Crops with PLANT FOOD

The Whole Truth—Not Selected Truth

R. H. STINCHFIELD, *Editor*

Editorial Office: 1155 16th Street, N. W., Washington 6, D. C.

VOLUME XXVIII NO. 5

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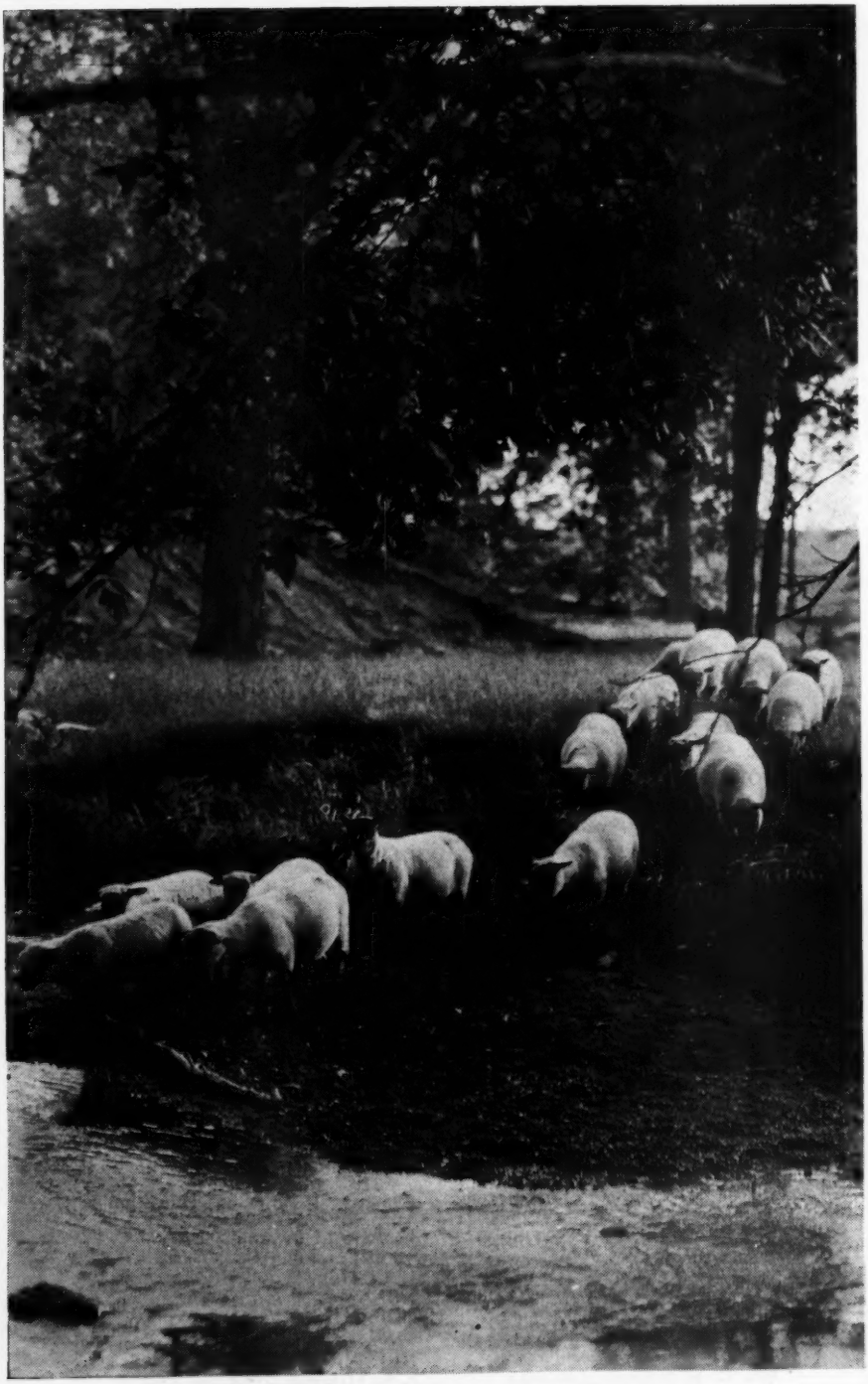

TO CLOSE SHORN SHEEP GOD GIVES WIND TO MEASURE.—*Old English Proverb.*

Better Crops with PLANT FOOD

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Not Progressive...

Just Doped!

Jeff McDermid

MY favorite bard, Bobbie Burns, once said that it would do us good to see ourselves as others see us. Hence, I come to bat this month with a text taken from that proud but deceitful publication called Das Schwarze Korps, issued regularly in Germany by the Nazi Elite Guard. Listen to their latest attempt to bolster up the fading fanatics of the Third Reich and save their kowtowing youth from the decadence of America:

"Nazi youth have nothing to fear from Russian Bolshevism, which is mere materialism, while senile England has nothing to attract the young; but Americanism must be taken seriously in our struggle for the generations of the future. for Americanism is not only comfortable but also pleasant, and has attractions that carry a drug-like effect."

I have known for a long time that the good old corner drugstore was a mecca for the spirited youth of our fair land, whose coke parties and high school chatter kept a thousand Mister Peavies busy and content. But I did not realize the portents of the general situation in America, wherein we have become addicts to Nirvana and heroin heroes. I have heard congressmen speak of the New Deal as a "shot in the arm," but I had no idea it had become habitual for us to exist in a world of fantasy and forgetfulness.

Just as DeQuincy once wrote the confessions of an opium eater, so it's time for some of us perverted patriots to lay bare our weakness for the sedatives of Yankeeland and give a true account of our struggle to overcome

the temptations of a degenerate democracy. So here goes.

My first remembrance of partaking of the American dope was in sundry Fourth of July and Memorial Day celebrations, watching parades, fireworks and cannon blasting, and listening to fervid statesmen spiel. But the thing that nicked me hardest in the vulnerable veins was the attitude of Ma and Pa about such loud-mouthed anarchists as the late Emma Goldman. She flourished back in the eighteen-nineties, and perhaps in spots she was not so much different than subsequent spokesmen, but her language sounded like sedition to my family.

"IF Emma and her crowd don't like America, let 'em take the next boat and sail right back where they came from, and see if they'll get any better treatment there," was the comment always made by Pa and Ma.

So you see I got my dope habit naturally, having a couple of parents who were deep-dyed addicts to the pernicious American drug habit. But I want to show how they got that way.

One of my Grandpas came over in the steerage without a penny. The lady he later made my Grandma was also a lonely immigrant servant girl. After they were married they loped off westward seeking more dope. Life in New York city was too easy and uneventful, with only Barnum's midgets and Van Amberg's menagerie to liven things up on Sundays. Prize fighting was in its infancy and Cooperstown had not invented baseball yet. They wanted to see real hyenas, clawing catamounts, and vicious varmints, not to mention real Injuns and war-whoops.

Moreover, they craved for night life at its worst. When they got out west they got it. Grandma had to make her bed in the forest until Grandpa and the neighbors built a lean-to cabin. He worked nights to finish it, and Grandma had plenty of hectic night life bearing her children and nursing them, as well as sitting up with neighbor women in the same situation. For night club music they had the wolves and the winds, and believe me it was great dope! You can't beat it in Berlin, even now!

The tother Grandpa and Grandma found life in Vermont too tame and listless too, and their veins cried out for that strange drug which returning travelers told them was to be had by taking the Erie Canal boats out toward the Great Lakes and beyond. Here they decided to stop awhile, get a fresh fill of drugs, and bring up some kids, including my Pa.

Yes, sir, that was some powerful tonic those days. My Pa chopped rails, hoed sod corn, helped clear an eighty, went to district school about six months in ten years, enlisted in the Civil War, got wounded, slept in swamp water up to his hocks, had fever n' ague that shook his teeth loose, caught a dose of malaria and dysentery that made him feeble for years, and had a pension of fifteen bucks a month to buy dope with ever after.

As I recall it, Pa never got rid of those spells of dope. I can see him now, standing in the corner grocery with one hand in the prune box and the other raised to salute the flag, because the latter insured him a continued dose of free dope for a spree. The best way to make him hopping mad was to mention anarchists and belittlers of America. That drug sure got Pa, and no wonder it was transmitted down to me when the time came.

AS a side-light, let me say that quite some number of my Pa's old-time neighbors and pals were Germans of kultur, such as it was in those days, and strange enough they were anxious to wade through hell and high water, just like Pa was, to get a dram or two of that noxious dope retailed under the stars and stripes brand. More sauerkraut soldiers of Gen. Siegel were suckers in those days too, and so were the followers of Carl Schurz. How silly of them to prefer the cheap com-

forts and mirages of America to the sturdy independence of the upright old Vaterland. All those poor dopes and dupes could do was sing, "I fought mit Siegel and stand mit Schurz." Just think, they might have stayed in Prussia or Bavaria and sired some of the Elite Guard of today! Or maybe they have after all and don't know it yet.

Time and circumstances kicked my Ma around some too, but she always kept her American drug handy. In fact between shifts she managed to fill

a hefty scrapbook with lots of inspirational recipes and references to the kind of dope she used to scare off the heebie-jeebies. But with her and other women the American drug habit was mixed up somehow with religious fervor, giving Washington and Lincoln their shrines close to the family altar.

Thus I sure got it laid into me from both sides. I got plenty of needling from the family drug shelf, that slowly and surely made me a wan and hopeless devotee of this American poison, so pleasant to take and so easy to swallow!

Our folks thought this drug was dandy for every ailment of the mind and heart, and they were also simple enough to insist that the brand of dope distilled in our particular state and county was the most glorious elixir of all that witch's cauldron set simmering by the American Revolution and carried west in Conestoga wagons, canal boats, and on horseback.

I understand it's the same in other sections remote from my stamping ground. New Yorkers think no dope is as stimulating as the Borough of Manhattan brand. Others say California's Rose Balm is mighty soothing; that the District of Columbia brand packs a wallop, and that the biggest whoopee-and-holler-loud concoction is the proud boast of Texas with its Longhorn Liquid Lightning and its Oil of Omnipotence. Likewise it would be unfair to forget old Tennessee and its insidious Mountain Magic, which made such drug fiends as Davy Crockett, Andy Jackson, and Sergeant York!

In spite of my early encouragement to become an American dope addict, imbibing it in the family circle and getting it fed to me with my porridge, I've never until Pearl Harbor date taken enough of it to amount to much —compared to some other Americans. In most temperance confessions you don't find a guy apologizing for not getting loaded high enough, but that's me all over, I'm just different and want to be honest about it.

POET POPE says that a little is a dangerous thing, "drink deep or taste not the Pierian spring." There I was, right on the brink of the biggest ocean of dope you can imagine and not gulping enough of it to give me the jag required to become a "dangerous American." When I think of the gallonage of drug my kinfolk took in, my performance rates pretty meager. But during the last three years my intake has been close to the norm set by inheritance and environment. Praise be for the open jug!

It's easy to trace the effects of this awful American drug through two preceding generations of misguided citizens. When my grandparents hit the wilderness hot for more hooch to make them forget, the country was an isolated realm. What Europe or Asia or Timbuktu thought or did was of little account and nobody heard of it for ages and cared less. And our own East and West were not twain by any means.

Then along came two dope fiends,

(*Turn to page* 50)

More About Soybean Fertilization[1]

By M. T. Vittum and R. R. Mulvey [2]

Agronomy Department, Purdue University, Lafayette, Indiana

SOYBEANS are here to stay, and government authorities are requesting that an increased acreage be devoted to this important war crop. With the labor and machinery bottlenecks accompanying the present war, it is quite likely that farmers will be unable to greatly expand the acreage devoted to soybeans. Thus it seems that the greatest potentialities of increased production can only be obtained through maximum per-acre yields, and, obviously, maximum yields can only be obtained with adequate nutrition of the crop.

Up until a few years ago, it was believed that fertilizers could not be effectively applied to the soil the same year the soybeans were grown. However, recent experiments which include a consideration of the various factors involved, especially proper placement of the proper kinds and amounts of plant nutrients, have shown that soybeans not only respond to direct fertilization but are also very capable of utilizing plant food remaining after heavy applications made to the preceding crop.

During the past three years, agronomists at the Purdue University Agricultural Experiment Station have obtained some very interesting results from field experiments on the fertilization of soybeans. Some of these results will be discussed here.

Results of Demonstrations in 1942:

In the spring of 1942, Enfield (1)[3] laid out a series of cooperative soybean fertilizer demonstrations on Indiana farms. He broadcast and plowed under 0, 500, and 1,000 pounds of either 0-12-12, 0-10-20, or 0-8-24 per acre, depending upon the soil type involved. The increases obtained from the fertilizer varied from 4.7 to 17.8 bushels per acre over the yield of the unfertilized check plots. On one potash-deficient soil, the unfertilized beans yielded 9.9 bushels per acre, while 500 pounds of 0-8-24 broadcast and plowed under yielded 22.8 bushels and 1,000 pounds produced a yield of 27.7 bushels per acre. On another farm, the unfertilized beans averaged 18.0 bushels per acre, while 500 pounds of 0-12-12 broadcast and plowed under yielded 31.4 bushels and 1,000 pounds gave 33.4 bushels per acre.

Results at Lafayette in 1943:

At the Purdue Soils and Crops Farm at Lafayette, an experiment was conducted in 1943 to determine the effect of plow-sole applications of fertilizer on the maturity, yield, and fruiting habits of soybeans.

This experiment was conducted on a slightly acid (pH 6.4) Crosby silt loam. From 1915 to 1941, the land was in a three-year rotation of corn, wheat, and clover. During this period, all the crops were removed except the second-growth clover. No commercial fertilizers were added during this period; but manure, at the rate of six tons per acre per rotation, was compared to no manure on adjacent plots. Yield records indicate that by the end of this

[1] Journal Paper Number 163, Purdue University Agricultural Experiment Station.

[2] Technical Assistant and Associate in Crops, respectively.

[3] Figures in parentheses refer to "Literature Cited."

Fig. 1. This excellent field of Gibson soybeans, planted with only 30 lbs. of seed per acre, produced 32 bushels per acre. Louis Wagner Farm, Evansville, Indiana.

27-year period, two levels of fertility had been created.

In the spring of 1942, 400 pounds of 0-10-20 per acre were broadcast and plowed under for corn on plots representing both fertility levels. The corn on all plots was fertilized with 100 pounds of 0-12-12 per acre placed near the hill. In the spring of 1943, plow-sole applications of 400 pounds of 0-10-20 were made on other plots in the same series for the soybeans which followed the 1942 corn. The effects of the fertilizer on the maturity and yield of soybeans in 1943 are given in Table 1.

From the data in Table 1, it is seen that the 0-10-20 plowed under directly for soybeans in 1943 increased the yield 12.7 bushels (from 20.2 to 32.9) at the lower level of fertility, and 9.3 bushels (from 23.0 to 32.3) at the higher level of fertility.

The effect of the fertilizer on the

TABLE 1.—EFFECT OF 400 POUNDS 0–10–20 PER ACRE, PLOWED UNDER AT TWO FERTILITY LEVELS, ON THE YIELD AND MATURITY OF SOYBEANS IN 1943. CROSBY SILT LOAM, LAFAYETTE, INDIANA

Fertilizer plowed under for corn or soybeans	Maturity and yield of soybeans in 1943			
	On land unmanured 1915–1941		On land manured 1915–1941	
	Moisture Oct. 3 (per cent)	Yield per acre (bushels)	Moisture Oct. 3 (per cent)	Yield per acre (bushels)
None	58.6	20.2	52.6	23.0
400 lbs. 0–10–20 under for corn in 1942; residual for soybeans in 1943	31.9	25.8	16.7	29.0
400 lbs. 0–10–20 under for soybeans in 1943	12.3	32.9	12.6	32.3

maturity of the soybeans is even more striking than the effect on yield. From Table 1 we see that the 0-10-20 plowed under directly for the beans in 1943 greatly hastened maturity, as indicated by the moisture content of the beans on October 3. On the lower fertility level, the moisture content was reduced from 58.6 per cent on the unfertilized plots to 12.3 per cent on the fertilized plots; while on the high fertility level, the corresponding values were 52.6 per cent and 12.6 per cent, respectively. (See Figure 2.)

Without mineral fertilizers, plants on both previously manured and unmanured land showed severe potash-starvation symptoms during the growing season. Furthermore, by the middle of August, plants on all fertilized plots tested low for both phosphate and potash according to the Purdue plant-tissue test technique.

It was very evident before harvest time that large yield and quality differences due to treatment were to be expected. Therefore, studies were made on the pods of 60 plants selected at random from both fertilized and unfertilized plots to see how the added plant-food nutrients affected the fruiting habits of soybeans. The results of these determinations are presented in Table 2.

TABLE 2.—THE FILLING OF SOYBEAN PODS AS AFFECTED BY FERTILIZER TREATMENT. LAFAYETTE, INDIANA, 1943

Seeds in pods	Fertilizer treatment	
	None	400 lbs. 0–10–20 plowed under
None	4.3%	3.4%
One	30.5%	17.7%
Two	41.0%	34.9%
Three	24.2%	43.4%
Four	0.0%	0.6%

In Table 2, we see that the 0-10-20 fertilizer plowed under had a marked effect on the number of beans per pod. For example, 43 per cent of the pods on the fertilized plots contained three beans, while only 24 per cent of the pods from the unfertilized plots contained three beans.

Samples of the threshed beans from the two fertilizer treatments were studied for size and quality, and these results are given in Table 3.

TABLE 3.—THE FRUITING AND QUALITY OF SOYBEANS AS AFFECTED BY FERTILIZER TREATMENT. LAFAYETTE, INDIANA, 1943.

Fruiting and quality of soybeans	Fertilizer treatment		Increase for treatment (per cent)
	None	400 lbs. 0–10–20 plowed under	
Pods per plant, av.	47	57	+20
Seeds per pod, av.	1.85	2.20	+19
1,000 seed wt. gms.	119	145	+22
Commercially damaged seed [1]	3.6%	0.6%	−83.3
Purple-blotched seed	13.7%	2.3%	−83.7
Germination	82.5%	93.0%	+12.7
Whole beans through 10/64 slot screen [1]	6.9%	1.7%	−75.4

[1] By weight.

From the data in Table 3, we find that the fertilizer caused a very marked increase (about 20 per cent each) in number of pods per plant, number of seeds per pod, and weight of 1,000 seeds. In addition, the fertilizer caused a decrease in commercially damaged seed and purple-blotched seed; and it increased the germination from 82 per cent in the unfertilized beans to 93 per cent in the fertilized beans.

Thus, we can conclude that the 400 pounds of 0-10-20 plowed under for soybeans on this potash-deficient soil caused a marked increase in the yield, maturity, and quality of soybean seed in 1943.

Various long-time fertility experiments in Indiana have shown that soy-

beans have the ability to "feed at the second table." Over a period of years, the yields have been increased on an average from 3.2 to 10.6 bushels per acre by the practice of applying 400 to 600 pounds of fertilizer to the non-legumes (corn and wheat) in the rotation along with lime, manure, and legumes (clovers).

In recent years, it has been found that soybeans respond to plant food remaining when heavy amounts of fertilizer have been plowed under for the preceding corn crop on soils of low fertility. An excellent example is furnished in Table 1 where it is seen that the fertilizer plowed under in 1942 for the preceding corn crop increased the 1943 soybean yield from 20.2 to 25.8 bushels per acre on the unmanured land, and from 23.0 to 29.0 bushels per acre on the manured land. Furthermore, this residual fertilizer greatly hastened the maturity of the beans as indicated by the moisture content on October 3. On land unmanured from 1915-1941, the unfertilized beans contained 58.6 per cent moisture on October 3 while the beans growing on plots which received 400 pounds of 0-10-20 plowed under for corn contained 31.9 per cent moisture. On land which had received manure from 1915-1941, the corresponding moisture contents were 52.6 per cent for unfertilized and 16.7 per cent for residual fertilizer applied to the preceding corn crop.

Results on Clermont silt loam:

In 1941, Harry Cook and S. R. Miles conducted a corn fertilization experiment on a Clermont silt loam soil at North Vernon, Indiana. In this experiment various corn hybrids were planted across different levels of soil fertility which were obtained by plowing under 0, 1,000 and 2,000 pounds per acre of 8-8-8 fertilizer. In the spring of 1942, after half of each plot had received three tons per acre of ground limestone, soybeans were planted to determine the residual effect of the fertilizer applied to the corn in 1941. The yields of the 1942 soybeans for the low and high fertility levels on unlimed (pH 4.8) and limed (pH 5.8) plots are given in Table 4. These yields have been reported previously (2).

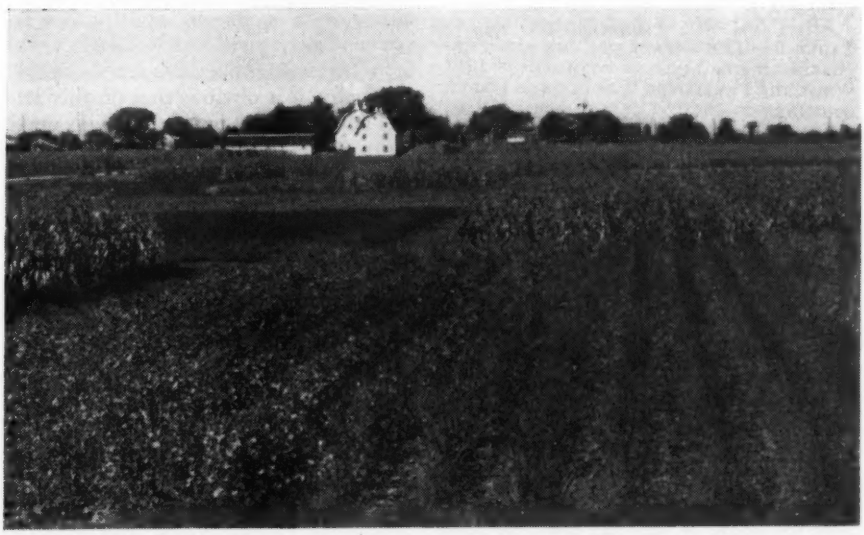

Fig. 2. The effect of fertilizer on the maturity of soybeans. The plot on the left has received no manure or fertilizer since 1915. It yielded 20.2 bu. per acre in 1943, and the beans contained 58.6 per cent moisture on October 3. The plot on the right received 6 tons of manure per rotation from 1915-1941, and 400 lbs. of 0-10-20 were plowed under for the soybeans in 1943. Yield was 32.3 bu. per acre, and moisture content on October 3 was down to 12.6 per cent. Crosby silt loam soil, Lafayette, Indiana.

TABLE 4.—THE EFFECT OF LIME AND FERTILIZER ON THE YIELD OF SOYBEANS IN 1942 WHEN THE FERTILIZER WAS BROADCAST AND PLOWED UNDER FOR CORN IN 1941 ON A VERY ACID SOIL. CLERMONT SILT LOAM, NORTH VERNON, INDIANA

Treatment	Yield in bushels per acre			
	1941 corn	1942 soybeans		
		Unlimed [1]	Limed	Effect of lime
No fertilizer	40	8.4	15.1	6.7
2,000 lbs. 8–8–8 plowed under for corn in 1941	81	13.6	21.2	7.6
Effect of fertilizer	41	5.2	6.1	

[1] Three tons of ground limestone per acre applied in spring of 1942.

In the spring of 1943, soybeans were again planted on this field to determine the two-year residual effect of the fertilizer applied to the corn in 1941. The 1943 yields from the unlimed and limed plots are given in Table 5.

TABLE 5.—THE EFFECT OF LIME AND FERTILIZER ON THE YIELD OF SOYBEANS IN 1943 WHEN THE FERTILIZER WAS PLOWED UNDER FOR CORN IN 1941. CLERMONT SILT LOAM, CLOVERDALE, INDIANA.

Treatment	Yield in bushels per acre			
	1941 corn	1943 soybeans		
		Unlimed	Limed[1]	Effect of lime
No fertilizer	40	8.2	12.6	4.4
2,000 lbs. 8–8–8 plowed under for corn in 1941	81	10.4	18.1	7.7
Effect of fertilizer	41	2.2	5.5	

[1] Three tons of ground limestone per acre applied in the spring of 1942.

Examination of the data in Tables 4 and 5 reveals several interesting and important points in regard to fertilizing soybeans. In the first place there is a tremendous response to lime on this very acid (pH 4.8) soil. In 1942, lime gave an increase of 6.7 bushels per acre on the unfertilized plot and 7.6 bushels on the fertilized plot, while in 1943 the corresponding increases were 4.4 and 7.7 bushels per acre, respectively. Thus, it is very obvious that a farmer cannot afford to grow soybeans on this acid soil without first applying adequate amounts of lime.

In the second place, the soybeans were not only able to feed at the "second table," but they were also very capable of feeding at the "third table" as well. In 1942, the residual effect of the 2,000 pounds of 8-8-8 plowed under for the preceding corn crop caused an increase in yield of 5.2 bushels per acre on the unlimed plot and 6.1 bushels per acre on the limed plot. This marked residual effect of the fertilizer continued through the third year, for in 1943 the corresponding increases were 2.2 and 5.5 bushels per acre respectively. These increases in soybean yields were obtained in addition to a 41-bushel increase of corn yield in 1941, the year the fertilizer was applied.

Finally, it is obvious that on this acid soil which is very low in fertility, maximum yields of soybeans can only be obtained with a combination of lime and fertilizer. Neither of these two factors alone is adequate; a combination of the two is necessary to give the largest yields.

Results on Vigo Silt Loam

Another example of the response of soybeans to residual fertilizer supplied to the preceding crop is found in an experiment on a low fertility, light-colored (Vigo) silt loam soil at Cloverdale, Indiana. In 1942, O. W. Luetkemeier laid out a series of plots to compare the effects of various kinds and amounts of plow-sole fertilizers on the yield of corn (2). In the spring of 1943, these

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Borax Spray for Turnips

By T. D. MacLachlan
Ontario Agricultural College, Guelph, Ontario

The author, mixing the spray.

THE table turnip (rutabaga) is an important cash crop in western Ontario. Some idea of its extent may be gained from the fact that more than 2 million bushels of the 1942 crop were shipped to the United States market, alone.

Water-core or brown heart is one of the most troublesome diseases with which the growers have had to contend. It is difficult to give an estimate of the annual loss from this disease because the extent to which it develops fluctuates from year to year and, furthermore, growers whose turnips are severely water-cored use them as stock feed. In some years the average loss of salable turnips from this disease has been estimated as high as 20 per cent, but if one considers individual farmers who grow turnips for shipping purposes, only, the loss may be almost 100 per cent.

It is practically impossible to detect a water-cored turnip without cutting the root. Severely affected turnips may be off shape and have a rough corky to leathery skin. In the early stages of development, the disease appears as water-soaked areas in the turnip flesh; these areas may increase in size until almost the entire root is involved. Severely diseased turnips may become brown and punky inside, a condition more apt to be seen in storage than in the field in western Ontario.

Water-core is a symptom of boron deficiency. It is more prevalent in soils of neutral to alkaline reaction containing a high lime content. Whether or not the calcium in the soil reduces the availability of soil boron to the roots, or interferes with the normal function of boron within the turnip itself, is still open to question.

In some parts of Canada 10 to 30 lbs. of borax per acre, applied to the soil prior to seeding, will completely prevent water-core. This procedure has not been generally adopted in western Ontario because too many failures have been met. Some experiments carried on at the Ontario Agricultural College indicated that the amount of borax required as soil applications to prevent water-core of turnips might be so great that there would be danger of residual toxicity to at least some of the succeeding crops in the rotation series. The high calcium content of many of the soils in the turnip districts of western Ontario is a likely contributing factor to failures in the control of water-core when soil applications of borax are used.

Investigations carried on at the Ontario Agricultural College have shown that the required amounts of boron can be supplied to the turnip plant, in a practical manner, by spraying the leaves with an aqueous solution of borax. A promising spray schedule was obtained during 1941 and 1942 by means of small plot experiments. During 1942 this spray schedule was tested on block areas within several turnip fields, and practically complete control was obtained regardless of water-core incidence in unsprayed portions of the fields. In 1943 more than 250 acres of turnips in widely scattered turnip districts of western Ontario were sprayed on a commercial basis. It was difficult to obtain quantitative data on the effectiveness of the commercial spraying because many farmers left either inadequate or no checks at all. However, on seven farms involving 46 acres of turnips, adequate checks were left and these developed such a high incidence of water-core that it was obvious the entire fields would have been condemned had they not been sprayed; practically complete control was obtained by spraying. In no instance did any appreciable amount of water-core develop where the spray was applied at the proper time and in the proper manner. In general, the results were such that the turnip growers are enthusiastically accepting spraying as a practical means to control water-core.

The spray mixture is made up as follows: In 40 gallons of water dissolve 8 lbs. of borax (or saturation in cold water), stir in 2 lbs. of bentonite clay as a sticker, screen the mixture into the spray tank, then add ½ pint of Orvus paste (Procter and Gamble, Toronto) as a spreader. The amount of Orvus can be reduced in succeeding tankfuls if it tends to accumulate as a froth. About 40 gallons of spray is required per acre of turnips. The borax will dissolve more rapidly and a higher concentration of borax can be obtained by using hot water. If such is used, however, the borax should be carefully measured so that not more than 8 lbs. are dissolved in 40 gallons of water; otherwise, burning of the turnip leaves will occur. This burning will show as white, papery, irregular spots on the leaves.

Any type of sprayer can be used so long as a uniform coverage of the upper surfaces of the leaves is obtained. It is not necessary to spray the undersides of the leaves nor use high pressures. Many growers used a 40-gallon, 4-row, potato sprayer with one nozzle per row turned down on the foliage. The most efficient equipment observed was that of a tractor with a spray tank mounted on a platform over the rear axle and a 4-row boom attached behind the front wheels. No appreciable mechanical damage to foliage or roots was caused by any of the spray equipment; a rubber-tired tractor caused the least damage.

The spray can be considered as a preventive but not as a cure. Spraying was found to be useless after water-core was already present in the roots, and its effect was reduced materially if water-core were to develop shortly after spraying. It is recommended that the first spray be applied when the roots are 1 to 1½ inches in diameter but not more than 2 inches.

Many growers obtained complete control of water-core with a single spray. However, it was clearly demonstrated that in instances where a high incidence of water-core would normally occur, a second spray is required one month after the first spray. Therefore, where more than a mild occurrence of water-core is anticipated, two sprays are recommended; the first when the roots are 1 to 1½ inches in diameter but not more than 2 inches, and the second spray one month later.

The cost of materials for spraying is less than one dollar per acre per spray which is cheap insurance against such a troublesome disease. Because of war restrictions on spray equipment the growers in many turnip localities are making arrangements for custom spraying.

Assistant Agent Burnett, left, Marshall county, Tenn., tried some demonstration potash on tomatoes. Both yield and quality of the crop were greatly increased.

Southern Crops Show Need of Potash

*By H. E. Hendricks**

University of Tennessee, Knoxville, Tennessee

IN the report of the Tennessee Experiment Station of 1884, under the discussion of the response of wheat to chemical fertilizers at the University Farm, Knoxville, it is noted: "The experiments under this section were not continued in 1884 because the expense of fertilizing with this class of agents (1879-1883) so far exceeded any increase in the yield that there was no hope of getting any results that would be of practical utility." Among the materials used were dissolved phosphate, sulphate and muriate of potash, nitrate of soda and sulphate of ammonia.

Many changes affecting the practical use of fertilizers have occurred since 1884. Fertilizers today are cheaper than they were then and the values of crop commodities are greater. The land itself has changed during this 60-year interval of cropping and the system of farming is also quite different from that in 1884. Today, therefore, the use of fertilizers for wheat in this section is generally necessary for profitable yields. In the 1941 report of the Station, it is stated: "These crops (lespedeza) remove far more of the mineral elements of plant food than was re-

* The writer is indebted to Dr. Eric Winters, Professor of Agronomy, and Dr. J. B. Washko, Associate Agronomist, U-T College of Agriculture; Dr. H. B. Mann and C. W. Summerour, American Potash Institute; N. C. Myers, Knoxville Fertilizer Company; 81 County and Assistant County Agents; and 797 farmers, who assisted in supplying and distributing material, and securing and interpreting reports.

moved under the old style farming. The poor yield of corn and other crops following the removal of lespedeza hay for a few years was found to be attributable to a lowered soil content of available potash."

There are soils in Tennessee that have been known for many years to be so deficient in available potash that potash applications for the production of almost any farm crop were recommended without question. In addition, fertilizers containing potash have been recommended on a wide grouping of soils where specialty crops such as tobacco, etc., were to be produced. However, on quite a large area of well-drained upland soils, potash deficiency has been of little concern.

In 1943, working with County Agricultural Agents, the Department of Agronomy in cooperation with the American Potash Institute undertook to explore the problem of potash deficiency in Tennessee on a wider scale than had ever before been attempted, by testing the response of some of our important field crops to potash applications.

All of the 94 County Agents in Tennessee were invited to participate in this potash test demonstration project. Of this number 81 responded and requested material to establish a total of 1,469 demonstrations divided as follows: cotton—297; corn—360; tobacco—224; alfalfa—305; and red clover —283. All of the demonstrations were one acre in size and received an application of 100 pounds muriate of potash except corn, which was two acres in size and received 50 pounds of potash per acre. This was all in addition to the regular fertilization which the cooperating farmer used over his entire acreage.

Of the 1,469 demonstrations established, reports of results were received either from County Agents, or from cooperating farmers through the Agents, on a total of 797 demonstrations, divided as follows: cotton—204; corn—233; tobacco—148; alfalfa—108; and red clover—104.

Since the alfalfa and red clover demonstrations also received applications of borax both with and without potash, and since these results have, in general, been published in another report, THE USE OF BORAX IN THE LEGUME-LIVESTOCK PROGRAM OF THE SOUTH (BETTER CROPS WITH PLANT

Hagerstown soil is usually considered fairly well supplied with available potash. The difference shown here (left) meant over 300 lbs. seed cotton at harvest.

Food, February, 1944), the discussion of results here will be confined to cotton, corn, and tobacco.

The reports of results obtained on these three crops are very interesting. It may even be said that some of the statements made accompanying the reports are entertaining. As would naturally be expected, the response reported was not entirely consistent, particularly on cotton and corn. Upon investigation, however, most of the conflicting results can be explained.

The method used in obtaining results of potash on cotton and corn was generally the harvest of four rows, both where the extra potash had been and had not been applied. In some cases, yields were calculated on an acre basis. In others, actual weights of the rows were sent in, which necessitated a percentage comparison. On tobacco, the results for the most part were, by observation, estimation of comparative yields, and a description of quality.

Nothing fundamentally new was expected from these demonstrations, yet they have contributed to a better understanding of crop response to potash material on many of our soil types and have also demonstrated how the material should be used if response is to be expected. Weather conditions in Middle and West Tennessee in 1943 were extremely dry, while in East Tennessee they were very favorable.

Summarizing all the reports received as a State pattern by crops with respect to whether profitable response was obtained, we have the following:

Crop	Per Cent Showing Profitable Response	Per Cent Showing Little or No Response	Per Cent Showing Negative Response
Cotton.....	71	24	5
Corn.....	48	49	3
Tobacco.....	78	22	..

The decreased yields were naturally obtained by decreased stands of corn and cotton through injury to germination, or by retarding plant emergence. This might also have been a factor in some cases where little or no response was obtained. In the majority of cases the salt was applied in the row with the seed.

The writer will attempt to give a brief, overall discussion of the observations of these demonstrations by crops, and then let a few of the County Agents and demonstrators tell their experiences in their own words.

Cotton: In most of these demonstrations, some potash was used in mixed goods applied on the entire crop. The amount usually ranged from 12 to 24 pounds K_2O. The additional 60 pounds of K_2O were naturally most beneficial on the most potash-deficient soils. Where injury to stand or emergence was not noted, the additional potash grew the cotton off faster, increased the size of the plant, prevented rust, opened the cotton earlier and more thoroughly, made it easier to pick, and gave a higher grade of cotton. Some of these are results of considerable value aside from the yield of seed cotton.

One of the demonstrators in Franklin county writes: "It was very dry. The potash cotton stayed green and opened fluffy where lots of the other dried open."

From the report of W. F. Moss, County Agent in Marshall county, comes a report that is a little confusing: "Lloyd Adams of the Farmington Community moistened his cotton seed and rolled them in the potash allowing the seed to take up all of the potash they would. The balance was put in the hopper with the seed. The total rate of application was 100 pounds per acre. From the beginning, there was a big difference. The cotton rolled in potash came up quickly and to a more uniform stand than the untreated seed. The treated area maintained a lead throughout the growing season. The treated cotton also opened better and, according to Lloyd, picked easier. The first two pickings yielded 366 pounds more

seed cotton per acre than the untreated area. This increase was valued at $31.11."

Ray S. Ward, Assistant County Agent in Soil Conservation, Lincoln county, says: "Where the potash fertilizer was applied along with other fertilizer, considerable increase in yield was found when actual weights were made. The leaves remained on the plant longer, a greater per cent of the bolls matured, bolls opened better, and the cotton was easier to pick, seemed to hang out of the bolls. The entire plant showed a healthier appearance, and a smaller per cent of rust was found.

"Looking over a large field of cotton, it was very easy to tell where the potash was applied due to the bolls opening and cotton showing so much whiter."

Ward reported details on several demonstrations showing increases in the yield of seed cotton of from 400 to 600 pounds per acre.

From Lewis E. Hewgley, Assistant County Agent in Giles county, comes this report: "Good results were obtained on cotton ranging from over 200 down to approximately 100 pounds yield in seed cotton. I believe in one case we had as much difference as 275 pounds. Most farmers said that cotton opened and picked remarkably better. Rust was controlled by the application. I think we can definitely state that additional applications of potash to cotton are profitable to the average farmer in this county."

In contrast to these, Herbert L. Williams, Assistant Agent in Polk county reported numerous negative results such as the following on the farm of R. E. Firestone: "The cotton receiving the extra potash was slow coming up and getting started. It was a poor stand, although the bolls and stalks were larger. The check plot yielded 11 per cent more cotton per acre due to thicker stand."

K. B. McPherson, Assistant County Agent, says: "Several demonstrators apparently got their potash too close to cotton seed in the row at planting time. Cotton land treated was slow and irregular to germinate and early growth was retarded compared to untreated land in the same field. As the season advanced the stand and growth caught up and in a few instances passed that on plots where potash was not applied. There were four weeks of hot dry weather that caused a good many bolls not to open. There were more bolls on the fertilized cotton than on the other."

Corn: The value of the effect of potash on corn was not generally as great as on the other crops. This may have been attributable in part to an inadequate supply of other plant nutrients, particularly nitrogen. On many of the demonstrations where increases were noted, the value of the increase was barely profitable. On our more potash-deficient soils, however, located in areas in Middle and West Tennessee, the ground was not thoroughly wet after the corn was planted until harvest. In addition to increases in yield, it seemed to be general that potash applications to corn improved the quality of the grain and hastened maturity from about a week to ten days. Some of the County Agents' observations follow:

Shelby county.—From Assistant County Agent John V. Reid: "The other one (demonstrator) did not get complete data, but did get an excellent response. He used this potash on Calhoun soil which is certainly typical potash-deficient soil. Two average rows, on which potash was used, yielded 42 pounds—two average rows where potash was not used yielded 28 pounds. This showed an increase of 50 per cent by the use of potash."

From Morgan county in East Tennessee, County Agent Edwards says, "H. N. England reported a 25 per cent increase in yield of corn treated with potash and better than 20 per cent on potatoes side-dressed with potash."

Another East Tennessee County Agent, O. G. Taylor, Loudon, reports: "One demonstration of potash on corn affected the germination where it came in contact with the seed, but even then

In Sevier county, Tenn., D. B. Hendrix, County Agent, is using potash demonstrations effectively in Extension teaching. The two center rows did not receive extra potash.

the increase was six bushels over the plot that did not receive potash and had a better germination. The other two demonstrations gave an increase of 11 and 12½ bushels per acre over the untreated plots. This corn was some taller and had larger stalks and larger ears. The fourth corn demonstrator estimated no difference but he did not weigh or measure his corn."

The Agent in Dickson county, Middle Tennessee, writes: "S. B. Noland reports that the corn grown with potash supplement had a sturdier stalk and darker foliage, stayed green to maturity, was exceptionally well filled out on the tip end, and had more feed value than corn grown with no potash supplement.

"Floyd T. Gillum reports from his demonstration that the corn stayed green longer and yield was lots better than where potash was not used.

"James A. Cooksey reports that the yield on corn where potash was used showed an increase of ⅓ over that where there was no potash used."

W. O. Donnell reported to County Agent Massey in Warren county: "I did not notice any difference in the plant growth, but the ears seemed to be better matured and heavier. The season was very dry. The ground was never too wet to cultivate from the time the crop was planted until it was laid by."

Tobacco: All of the tobacco demonstrations had already received from 18 to 60 pounds K_2O per acre on the entire crop from mixed fertilizer. Nearly all of the fields also had been manured at the rate of from 10 to 20 loads per acre. The additional 60 pounds of K_2O, however, had very surprising results which were significantly consistent in the different parts of the State, on both dark-fired and burley tobacco.

By adding this extra 100 pounds of muriate of potash per acre, the yield was very profitably increased, the crop withstood the dry weather better, was prevented from wilting during hot weather, and firing of the bottom leaves was decreased, thus promoting more uniform ripening, and increasing the quality or selling price.

Excerpts from some of the tobacco reports are very interesting:

The Agent in Jackson county said: "On three of the treated plots there was quite a difference. The treated

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Two girls of the Woman's Land Army returning from a day's work.

They Who Work on These Crops

By C. B. Sherman

U. S. Department of Agriculture, Washington, D. C.

WHO is going to plant, tend, and harvest all those bigger and better crops this year? To answer that question means a quick review of how we got it done last year plus some plans for getting still more work but from less obvious sources this summer.

Fortunately a quick governmental study made in January has given us a clearer idea than we have had before of just who composed that huge farm working force last year. It answers, to a certain extent, those questions that have reverberated for months, but if we want the replies we must be reconciled to reading a good many figures, though not so many here as you would find in the published report by Louis Ducoff and Margaret Hagood. How did we manage to produce and harvest that huge total in the midst of war when both the armed services and the war industries had been draining away farm workers at a rapid rate? How many men, women, and young people were involved in this unprecedented undertaking? Who were they? Where did they come from? How was the work done?

New Totals

More than 14,500,000 different persons worked toward producing that huge food supply in 1943. Between

20 and 25 billion hours were devoted to farm work during the year. This would exceed 2 billion 10-hour days devoted to making the tremendous total of food and fiber needed for the war, says this report. Or it means that the equivalent of about 6,600,000 full man-years of work—10 hours of work every day in the year except Sundays—went into last year's farm output.

As the actual enumeration in the study covered 12 and a half million people who worked on farms last year, the rest being only closely estimated, the rounded figures quoted hereafter are based on the smaller total.

The Workers

Who were these men, women, and young people who contributed to put farm production well over the goals? How many were genuine farm people and how many were merely helping out?

Persons who were still living on farms last January—farmers, members of their families, and hired workers who live on farms—did the bulk of that farm work. In round numbers they constituted nearly 10 million, or more than 78 per cent of the workers. Naturally they worked more weeks and more hours per week than the workers who came out from cities, towns, and villages. They contributed more than 88 per cent of the total time put into agricultural work.

Young People

Young people certainly did their share. The experienced 4-H clubs and the newly organized Victory Farm Volunteers of high-school age were among them. Almost 2 million youths, 14 to 17 years old, did some farm work during the year. In round numbers 900,000 of these were farm boys, 400,000 were farm girls, and 500,000 were boys and girls who live elsewhere. (Children under 14 were not counted although they probably totaled well over a million.) As the seasons advanced, schools were generally closed, and the discussions of the subject grew prevalent, more than four times as many young people went out for some farm work as went in the first four months of the year.

Women

Women were a big part of the working force in the busy months from May through October. Nearly 3 million women who live on farms — mainly wives, daughters, and other relatives of farmers—made up nearly one-fourth of the total number who were working in agriculture during those months, and they put in about one-sixth of the total hours of farm work done in that period. For the year as a whole, farm women ranked second only to farm men in importance to farm production.

Men

Men, of course, furnished the great bulk of the work, and farm men formed the majority of the farm force in every season. They do the long steady hours of labor on which the United States depends for basic supply of food and fiber. Farm men accounted for about three-fourths of the total hours worked during 1943.

From Outside

What about all those people who were not living on farms but who helped to care for and harvest that record output? The onlookers' attention naturally turns toward them. Moreover that is a vital question to farmers, for these short-time seasonal workers who supply the extra help save the harvests. The Government study gives some answers.

For instance, during the six crucial farm months last year people from elsewhere—men, women, and youths—were nearly equal to the number of farm women who were working—there were about 2½ million of them. They made up 21 per cent of the total number that worked on the farms during this period, but they accounted for only 12 per cent of the total hours of farm work.

For the entire year, men and boys not living on farms (1,900,000 in all) averaged only 24 weeks of farm work, a little more than half the record of farm men. Their average length of workweek was 50 hours.

Women and girl workers not living on farms numbered 800,000 in all. These women had the lowest average input of time in farm work—67 ten-hour days of work during the year, spread over 16 calendar weeks.

People who had done some farm work during 1943 but were on other work by the time the study was made last January included mainly four groups: (1) those who have permanently shifted from farm work to other kinds, (2) those who live on farms, have full-time jobs elsewhere, but do some farm work after hours or on weekends, especially in the peak seasons, (3) those who regularly work on farms in the summer but shift to some other work in the winter, and (4) townspeople who do not usually work on farms at all, but who responded to the war cries last year and helped to harvest in "twilight armies" and other special groups. Or as individuals they worked on farms during vacations or weekends or during other "days off."

From what kind of work did most of the outside workers come—business, professional, or other labor? Here are some of the answers. More than one-third next worked in manufacturing industries (including foods), 17 per cent in wholesale and retail trade, and 11 per cent in professional and governmental service. No other major industry had as many as 10 per cent.

But about 3½ million persons who had helped on the farms were not working for pay or looking for work in January. More than 2 million of these were housewives. More than another million were youths in school. The remaining 300,000 were too old, or were not able to work, or were not working for some other reason.

Prospects for This Year

These new figures may shape some of the campaigns for farm helpers this year.

To get back into farm work the valued and experienced seasonal workers who have always been depended

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A hired girl pinchhitting for a hired man on a Cumberland County, Pa., farm.

Ladino clover in this apple orchard was fertilized with 500 lbs. of 0-12-12 per acre.

The Use of Fertilizer in Maryland

By R. P. Thomas

Soils Department, University of Maryland, College Park, Maryland

THE production of food and feed was never more urgent than now. Since Pearl Harbor this country has passed from the state of plenty, with acreage reduction to control surpluses, to unlimited production of food and feed to reduce starvation. The limitation in facilities for normal food production in many of the world's important food-growing countries is largely responsible for this change, although in many instances the distribution of food and feed in these countries is greatly reduced. It is very necessary then that some of the other countries increase their production. The geographical position of our country indicates that it should be one to make a maximum effort towards meeting this food and feed need. Maryland, as one unit of this country, should be able to do its part. This is a brief discussion of how such a demand may be met in Maryland.

In the past, this country has arisen to meet such emergency demands by increasing the acreage, although it was sometimes accomplished by growing more per acre. No doubt, along with these two methods was associated the more efficient use of labor and farm machinery. Under present conditions the shortage of both labor and farm machinery will not permit much expansion by this means. Neither will it permit very much of an acreage in-

crease. The most feasible way then to meet this demand for more food will be by increasing the quantity grown on each acre.

Most ways of increasing acre production may be placed under two headings; namely, better management practices and better fertilizing methods. The better management practices are generally brought about by years of experience or extensive and continued educational programs. Such practices are naturally slow to develop. The limited amount of time and less semi-skilled labor available make it very unlikely that much increase can result from better management practices. The most logical means of increasing the amount of food and feed grown from each acre that can be cultivated then will probably be the use of more fertilizer of better grades.

Since food comes directly or indirectly from the soil through plants, soil has to be considered as the most important factor in food and feed production. Soils are the warehouses or storage places for plant nutrients. The plants take these nutrients through their roots from the respective warehouses, and with the power or energy from the sun, use these nutrients in the manufacture of plant material. This plant material is then used either directly or indirectly as food. These soil storehouses are no different than man-made warehouses in that they have to be restocked occasionally or they become empty. They are depleted by the growing and removal of crops, by leaching, erosion, etc.

The plant is no different than any other complex manufacturing plant in that if any particular part or material is not being supplied in the quantity needed, the whole manufacturing process is slowed down. Fertilizers are used to restock these depleted supplies in the soil. Since soils are the resulting products of many factors working singly and in all manner of combinations, it is only natural that experimental data indicate that soils differ in their residual warehouse supplies, stockpiles, or fertilizer requirements. Just as the manufacturing plants which are operated by man vary in their needs for raw products, soils differ in their supply of plant nutrients and the plant varies in its need of different kinds and amounts of fertilizer or plant nutrients. Although there are many un-

This unfertilized plot yielded only 1,513 lbs. green weight per acre.

solved nutritional problems, from the soils viewpoint much progress has been made. In general the vast amount of experimental data have indicated the best fertilizer grades to use, the better methods of applying the fertilizer, and the amounts required for maximum production under most soil conditions.

The use of fertilizer has had a gradual development. Probably the first fertilizer material used consisted almost entirely of manure and animal waste. Typical example of this was the American Indians' practice of burying fish below each hill of corn. Bones were used early as a fertilizer material. When the phosphate rock deposits were discovered they supplemented and gradually replaced the limited amounts of bone material. In general, phosphorus has been the first limiting factor in plant growth, or soon became the hardest to get from these soil warehouses. The continued use of phosphorus alone, however, did not maintain satisfactory yield. Gradually nitrogen and potash were used to supplement the phosphoric acid. The vast amount of experimental data indicates that many of our soils need nitrogen, phosphoric acid, potash, lime, and, in many instances, some of the minor elements for good yields. The recent trends, which are based on experimental results, have shown that the nitrogen and potash in the fertilizer grades are increasing at a greater rate than phosphoric acid. The limitation of either nitrogen or potash in the fertilizer mixtures, and subsequently in the soil stockpile, would naturally limit maximum production of food and feed.

Along with the depletion of the supplies within these soil warehouses by crop removal comes a disintegration and destruction of the warehouses themselves. The granular structure of our soils has decreased as the organic matter disappeared. This loss of warehouse space reduces the ability of the soil to hold plant nutrients and causes a further need for fertilizer. Along with this loss of plant-food warehouses has come a breakdown in feeder lines used to bring the materials from the warehouses to the plant root. In soil terms this loss of soil organic matter has reduced biological activity in the soil which in turn has reduced the solvent action upon both organic and inorganic

This plot, receiving 1,000 lbs. 5-10-10 fertilizer, yielded 8,168 lbs. green weight per acre.

compounds in the soil. The soils are then not able in themselves to make as much plant nutrients available or to naturally restock their warehouses. This is just another example of the greater need for fertilizer in our accelerated use of soils to meet the present emergency needs for food.

Man has tried in many ways to overcome these losses of warehouses and supply lines or decreased amount of available plant food. He has tried to maintain the organic matter level of his soil as well as use larger quantities and more concentrated fertilizers. He also has selected or retooled his crops for a better utilization of the different kinds and amounts of plant food now found in the soil through plant-breeding methods. Man has introduced, by selections and crosses, crop varieties with genetic characteristics which enable them to grow better at the changed nutritional levels. This can be illustrated by the improved varieties of all crops with hybrid corn as a specific example.

The genetic make-up of such a plant is rather specific and permits it to produce more with a limited food supply from the soil, as well as to produce much more with heavy rates of fertilization. This may be compared to the introduction of new machinery or tools in a manufacturing plant which increases the efficiency of labor. Less labor can produce more, and more labor can produce much more. Hybrid corn gives better yields than the normal corn plants with the usual rates of fertilizer and much better yield when heavy amounts of fertilizer are used. This is especially important in times of good prices and feed shortage.

Man is, also, aiding by sprays, dusts, etc., our crop plants in their fight against insects and diseases even though the root of these problems may be nutritional. Such methods should be used to the maximum now. It should be recognized, however, that these are preservation and not production methods. Any unsatisfactory nutritional factors will still have to be corrected by the farmer through proper fertilizer practices and methods.

From our experimental evidence and field observation of farmer practices, we have arrived at a list of fertilizer grades for various crops and soil conditions. It must be recognized that these

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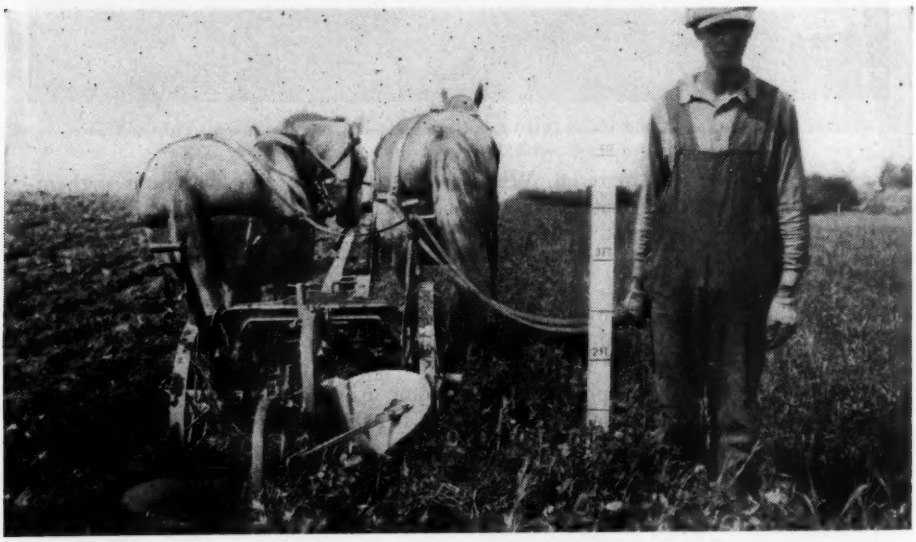


A fertilized clover crop such as this pays dividends in increased yield of following crop.

The Seed Production of Hairy Vetch and Other Winter Cover Crops

By Roland McKee

U. S. Department of Agriculture, Washington, D. C.

THE problems involved in the production and utilization of winter cover-crop seed are many and varied. Even the term is hard to define. In its broadest sense it can mean any crop planted in the fall which serves as cover during the winter regardless of what is to be done with it ultimately. In this article, however, the meaning will be confined to fall-seeded crops planted specifically to prevent the leaching of plant nutrients, to reduce erosion, and to add organic matter to the soil, either in the form of surface mulch or as material incorporated with the soil.

In recent years the proper recognition that crops so employed improve the soil and increase crop yields without requiring the land to be out of production for a year has created a demand for seed of such crops that exceeds the available supply. This popular interest was brought about by the need and desire of farmers to meet production goals of war crops, through the efforts of agricultural extension workers, and through the war agency programs looking to greater feed and food production.

An adequate seed supply of winter cover crops has for years been a problem for farmers using such crops for soil improvement, since regions or areas needing them most for this purpose unfortunately are not adapted to seed production. As a result, a specialized seed industry developed in one part of the country to supply seed for use in other parts. This has been especially true for the vetches and field peas.

Since the use of winter cover crops for soil improvement in normal times is motivated primarily by increased cash returns, the users of such crops have always been directly concerned with the price of seed; and the decision to plant or not to plant a cover crop often hinged entirely on such price. Consequently, the maintenance of present acreage plantings of such crops for soil improvement, or increased use, will depend upon the possibility of making seed available at a reasonably low cost.

Crops Most Used

The most extensively used winter cover crops are hairy vetch, Austrian winter field peas, and crimson clover. They are not only the crops most extensively used, but they are also among the most widely adapted. Rye and ryegrass are the only other commonly used cover crops that have as wide adaptation. Common vetch, burclover, blue lupine, monantha vetch, and sour clover are also good crops for the purpose, but their adaptation is more local. Fenugreek, purple vetch, Hungarian vetch, narrowleaf vetch, horse-beans, wild winter peas, Persian clover, etc., have a more limited use. Seed of but few of these crops can be produced in the area in which they are most needed. Austrian winter field peas, for example, cannot be grown satisfactorily as a seed crop in any part of the Cotton Belt.

Hairy vetch, which runs a close second to Austrian winter field peas in

extent of use as a cover crop, is not well adapted for seed production in most of the Cotton Belt. In the northern part of this region it will in most years set seed and produce fair seed crops wherever the vetch bruchid (sometimes called the vetch seed weevil) does not interfere. Unfortunately, this insect is already present in the Atlantic Coast States from New Jersey to Georgia and recently has been found in northern Alabama and Mississippi. It has not yet been reported in states adjacent to and immediately west of Mississippi, therefore this is a possible seed-producing area for the immediate future.

Since hairy vetch is the winter legume that has the virtue of succeeding best on average low-fertility soils, its production and use are advantageous for many sections. Austrian winter field peas, like hairy vetch, are better suited for low-fertility soils than most other winter cover crops, consequently also have a wide range of adaptation.

Thus, of the two winter cover crops most widely used in the South, seed of Austrian winter field peas cannot be produced at all where it is most needed on account of climatic conditions, and hairy vetch seed can be produced in only limited sections on account of climatic conditions and the destructive vetch bruchid.

Crimson clover, the third most widely adapted and used winter cover crop, usually sets seed in abundance. Unfortunately, it is more difficult to get a stand of crimson clover than it is of most any other winter cover crop. This is largely due to the fact that the seed will germinate in 24 hours, and, if dried subsequent to sprouting, will not renew growth. Thus a light shower may germinate the seed and a short subsequent dry spell kill the seedlings. Success, therefore, hinges on a thorough preparation and firming of the seedbed and planting when moisture conditions are favorable.

Other factors influencing the production of seed of these three important crops may be mentioned. The serious damage done to Austrian winter field peas in the South by several diseases has resulted in decreased plantings. This in turn has resulted in an increased demand for seed of hairy vetch or other winter legumes that may be used as a substitute. In the Pacific Northwest, where in recent years most of the hairy vetch seed has been produced, the vetch bruchid recently has gained a foothold and is gradually increasing, with prospects of greatly curtailing hairy vetch seed production in that area. Since climate and the vetch bruchid limit the areas where hairy vetch seed can be produced successfully and economically, the prospect for an increase in hairy vetch seed is anything but bright.

What is the Answer?

Is the situation hopeless or can something be done about it? It is possible to increase hairy vetch seed production in Arkansas and Oklahoma and eastern Texas, since these states seem yet to be free from the vetch bruchid. Possibly production could be increased some in the Great Lakes States, especially Michigan where limited amounts of hairy vetch seed have for years been produced. In normal times a few million pounds of hairy vetch are usually imported annually and this may again become a source of supply.

Since there are limitations to the availability of hairy vetch seed, it may be that other crops will have to be used as substitutes or alternates. On the higher fertility soils of the South it is possible to increase the use of common vetch, and in many areas the increased use of monantha vetch, spotted burclover, blue lupines, and wild winter peas is possible. Seed of all of these crops can be produced in the South, where locally adapted, and the use of home-grown seed would have the added advantage of being economical. Seed of common vetch is produced in the Pacific Northwest and is available in quantity from that Section.

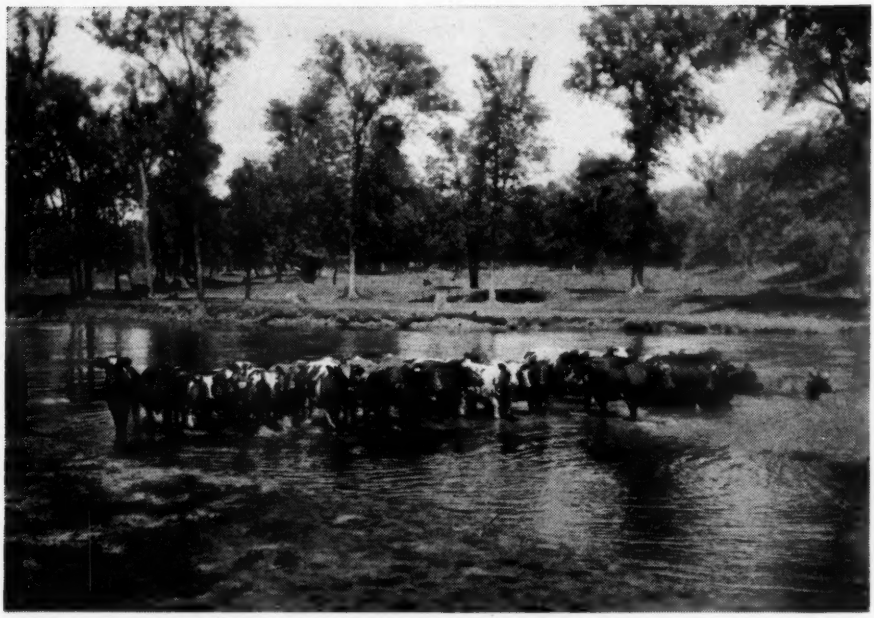
(*Turn to page* 50)

PICTORIAL

FARM GIRLS—A BRIGHT SPOT IN THE FARM LABOR PROBLEM.

SOME GOOD FARM HEADS

A LOOK AT THE FARM FRONT



Above: A good permanent pasture and stream of pure water are valuable assets to any dairyman in doing his full part in the 1944 National Milk Production Program.

Below: F. W. Tiedemann's "Pleasant Hill Farm" in Benton County, Iowa, lives up to its name. Rural landscaping has become an important project in better rural living.

The Editors Talk

A Program for the Production of Milk

An excellent program for any dairy farmer at any time is contained in the Eight-point National Milk Production Program for 1944. These eight points were worked out by the War Food Administration, the U. S. Department of Agriculture, and the State Agricultural Extension Services, in cooperation with the Dairy Industry Committee in order to help meet the high milk production goals set for 1944. They embody practices already in work on good dairy farms and their brevity, restricted to "what to do and why," should further the understanding of good dairying and prove a practical means of "fixing in mind" the fundamentals of success with the cow.

The points:

1. **Grow more legume hay, pasturage, and grain**
2. **Fertilize to increase quantity and quality of feed**
3. **Feed to avoid summer milk slump**
4. **Feed cows liberally during their dry period**
5. **Keep as many cows as feed and labor permit**
6. **Market more whole milk whenever possible**
7. **Produce good-quality milk and avoid waste**
8. **Breed for better herd replacements.**

As a sample of the "why," the publication of the program in folder form by the U. S. Department of Agriculture has this to say on Point 2:

"Much of the good pasture and hay land has been plowed up and put into grain crops. Many dairymen face a shortage of pasturage—the best feed for milk production and usually the cheapest feed.

"To get as much pasturage in 1944 as will be needed, most dairymen will find it necessary to improve the pastures they still have, and to grow some annual crop for temporary or supplemental pasture and to graze meadows.

"Very few of the dairy cows in this country have ever had all the good pasturage and good hay they could eat, day in and day out; but if pastures and hay crops were improved sufficiently to supply the necessary quantity and quality of roughage for such feeding, the use of concentrates could be reduced by one-third or more without any loss in milk production.

"Nothing excels well-rotted barnyard manure for improving pasture and hay yields. It should be used as far as it will go, and commercial fertilizers and lime should be used in the way advised by the local county agent.

"Fertilization pays on pasture and hay crops as well as on grain and row crops. Supplies of fertilizers are generally available, and applications can be made with very little labor."

Publicity given the Program has been good. It has been noted in articles in farm journals and weekly papers, in news releases from extension services, and in brief and illustrated extension circulars published by various states. Developed from the best dairy practices from all forty-eight states, the Program is designed for local adaptation, and such adaptation is seen in the publicity mentioned. For instance, Alabama's Extension circular (No. 267) gives specific instructions for achieving each point, as under Point 2 fertilizer recommendations for growing the crops mentioned under Point 1.

While necessarily organized on a long-time basis because herd improvement is never-ending, it is to be hoped that appreciable results from the Program will be realized in 1944. It is a fine piece of extension work and should be continued after the present urgency of increased milk production is lessened by the end of the war and the rehabilitation of devastated populaces.

Soil Improvement

In a recent edition of "Missouri Farm News Service," published weekly by the College of Agriculture, University of Missouri, at Columbia, Missouri, the question was asked: "To what extent is soil improvement being carried out on Missouri farms?" Dr. William A. Albrecht, Head of the Department of Soils of the University, answered the question, and while some of the details pertained only to his State, so much of Dr. Albrecht's reasoning would apply everywhere that we are prompted to repeat his answer here:

"Missouri farmers are showing their concern about the future productive capacities of their lands if the demands for limestone and all the other forms of fertilizers are any indication. Last year the demand for limestone was the highest in the history of the use of this soil treatment in the State, and fertilizer use made a similar showing.

"Unfortunately, we are not yet realizing how little fertility we are returning to our lands in the way of barnyard manure, legume green manures, limestone, and other fertilizers. Purchased fertilizers in Missouri amount to less than the equivalent of 1% of the value of the cash farm income that originates in the soil. We are running the farm plant on the belief that 1% of the income will maintain it or keep the soil factory going.

"When the ash of our common crops—the part from the soil—amounts to at least 5%, we are helping the soil by one-fifth while it is being exhausted to the extent of the other four-fifths of the crop load of fertility going out. For those crops that are more effective in animal production and in general food values, the part taken from the soil is higher and the share returned consequently so much lower.

"Such simple figures suggest that if our soils are to be productive and if we are to have crops of good service as food for animals and man from them, the fertility of the soil cannot be removed continually under intensive cultivation while we neglect our return of plant nourishment in every possible form.

"Soil maintenance for our future support calls for an investment in its upkeep in larger amounts than 1% of the farm cash return that the soil gives. The very basis of the farm business cannot be permanent with so little put back as maintenance of the very business establishment by which we live."

Farm Prices of Farm Products*

	Cotton Cents per lb.	Tobacco Cents per lb.	Potatoes Cents per bu.	Sweet Potatoes Cents per bu.	Corn Cents per bu.	Wheat Cents per bu.	Hay Dollars per ton	Cottonseed Dollars per ton	Truck Crops
1910–14 Average	12.4	10.4	69.6	87.6	64.8	88.0	11.94	21.59	....
1920	32.1	17.3	249.5	175.7	144.2	224.1	21.26	51.73	....
1921	12.3	19.5	103.8	118.7	58.7	119.0	12.96	22.18	....
1922	18.9	22.8	96.7	104.8	58.5	103.2	11.68	35.04	...
1923	26.7	19.0	84.1	104.4	80.1	98.9	12.29	43.69	....
1924	27.6	19.0	87.0	137.0	91.2	110.5	13.28	38.34	....
1925	22.1	16.8	113.9	171.6	99.9	151.0	12.54	35.07	....
1926	15.1	17.9	185.7	156.3	69.9	135.1	13.06	27.20	....
1927	15.9	20.7	132.3	114.0	78.8	120.5	12.00	28.56	....
1928	18.6	20.0	82.9	112.3	89.1	113.4	10.63	37.70	....
1929	17.7	18.6	93.7	118.4	87.6	102.7	11.56	34.98	....
1930	12.4	12.9	124.4	115.8	78.0	80.9	11.31	26.25	....
1931	7.6	8.2	72.7	92.9	49.8	48.8	9.76	17.04	....
1932	5.8	10.5	43.3	57.2	28.1	38.8	7.53	9.74	....
1933	8.1	12.9	66.0	59.4	36.5	58.1	6.81	12.32	....
1934	12.0	17.1	68.0	79.1	61.3	79.8	10.67	26.12	....
1935	11.6	16.1	49.4	73.9	77.4	86.4	10.57	35.56	....
1936	11.7	17.2	99.6	85.3	76.7	96.0	8.93	31.78	....
1937	11.1	19.9	88.3	91.8	94.8	107.1	10.36	30.24	....
1938	8.3	17.2	55.5	76.9	49.0	66.1	7.55	21.13	....
1939	8.7	13.6	68.1	75.4	47.6	63.6	6.95	22.17	....
1940	9.6	15.1	70.7	85.2	59.0	73.9	7.62	24.31	....
1941	13.3	19.1	64.6	94.4	64.3	84.0	8.10	35.04	....
1942	18.51	28.3	110.0	108.3	79.5	101.8	10.05	44.42	....
1943									
April	20.13	16.0	166.8	179.2	100.2	122.3	12.61	45.89	....
May	20.09	37.6	190.7	225.1	103.4	122.8	12.66	46.11	....
June	19.96	57.0	188.0	222.0	106.0	124.0	12.20	46.40	....
July	19.60	59.0	167.0	267.0	108.0	126.0	11.90	44.50	....
August	19.81	38.4	159.0	276.0	109.0	127.0	12.20	50.90	....
September	20.20	37.2	134.0	231.0	109.0	130.0	12.90	51.90	....
October	20.28	41.8	128.0	196.0	107.0	135.0	13.70	52.50	....
November	19.40	44.5	133.0	177.0	105.0	137.0	14.50	52.50	....
December	19.85	42.4	135.0	188.0	111.0	143.0	15.20	52.60	....
1944									
January	20.15	41.5	141.0	202.0	113.0	146.0	15.70	52.80	....
February	19.93	25.1	139.0	211.0	113.0	146.0	15.90	52.60	....
March	19.97	21.9	137.0	220.0	114.0	146.0	16.00	52.70	....
April	20.24	23.8	137.0	229.0	115.0	147.0	16.20	52.50	....

Index Numbers (1910-14 = 100)

1920	259	166	358	201	223	255	178	240	....
1921	99	187	149	136	91	135	109	103	....
1922	152	219	139	120	90	117	98	162	....
1923	215	183	121	119	124	112	103	202	....
1924	223	183	125	156	141	126	111	177	150
1925	178	161	164	196	154	172	105	162	153
1926	122	172	267	178	108	154	109	126	143
1927	128	199	190	130	122	137	101	132	121
1928	150	192	119	128	138	129	89	175	159
1929	143	179	135	135	135	117	97	162	149
1930	100	124	179	132	120	92	95	122	140
1931	61	79	104	106	77	55	82	79	117
1932	47	101	62	65	43	44	63	45	102
1933	65	124	95	68	56	66	57	57	105
1934	97	164	98	90	95	91	89	121	104
1935	94	155	71	84	119	98	89	165	126
1936	94	165	143	97	118	109	75	147	113
1937	90	191	127	105	146	122	87	140	122
1938	67	165	80	88	76	75	63	98	101
1939	70	131	98	86	73	72	58	103	109
1940	78	145	102	97	91	84	64	126	121
1941	107	184	93	108	99	95	68	162	145
1942	149	272	158	124	123	116	84	206	199
1943									
April	162	154	240	205	155	139	106	213	291
May	162	362	274	257	160	140	106	214	253
June	161	548	270	253	164	141	102	215	308
July	158	567	240	305	167	143	100	206	315
August	160	369	228	315	168	144	102	236	308
September	163	358	193	264	168	148	108	240	311
October	164	402	184	224	165	153	115	243	264
November	156	428	191	202	162	156	121	243	254
December	160	408	194	215	171	163	127	244	208
1944									
January	163	399	203	231	174	166	131	245	231
February	161	241	200	241	174	166	133	244	204
March	161	211	197	251	176	166	134	244	191
April	163	229	197	261	177	167	136	243	184

Wholesale Prices of Ammoniates

	Nitrate of soda per unit N bulk	Sulphate of ammonia bulk per unit N	Cottonseed meal S. E. Mills per unit N	Fish scrap, dried 11–12% ammonia, 15% bone phosphate, f.o.b. factory, bulk per unit N	Fish scrap, wet acidulated, 6% ammonia, 3% bone phosphate, f.o.b. factory, bulk per unit N	Tankage 11% ammonia, 15% bone phosphate, f.o.b. Chicago, bulk, per unit N	High grade ground blood, 16–17% ammonia, Chicago, bulk, per unit N
1910–14	$2.68	$2.85	$3.50	$3.53	$3.05	$3.37	$3.52
1922	3.04	2.58	6.07	4.66	3.54	4.75	4.99
1923	3.02	2.90	6.19	4.83	4.25	4.59	5.16
1924	2.99	2.44	5.87	5.02	4.41	3.60	4.25
1925	3.11	2.47	5.41	5.34	4.71	3.97	4.75
1926	3.06	2.41	4.40	4.95	4.15	4.36	4.90
1927	3.01	2.26	5.07	5.87	4.35	4.32	5.70
1928	2.67	2.30	7.06	6.63	5.28	4.92	6.00
1929	2.57	2.04	5.64	5.00	4.69	4.61	5.72
1930	2.47	1.81	4.78	4.96	4.15	3.79	4.58
1931	2.34	1.46	3.10	3.95	3.33	2.11	2.46
1932	1.87	1.04	2.18	2.18	1.82	1.21	1.36
1933	1.52	1.12	2.95	2.86	2.58	2.06	2.46
1934	1.52	1.20	4.46	3.15	2.84	2.67	3.27
1935	1.47	1.15	4.59	3.10	2.65	3.06	3.65
1936	1.53	1.23	4.17	3.42	2.67	3.58	4.25
1937	1.63	1.32	4.91	4.66	3.65	4.04	4.80
1938	1.69	1.38	3.69	3.76	3.17	3.15	3.53
1939	1.69	1.35	4.02	4.41	3.12	3.87	3.90
1940	1.69	1.36	4.64	4.36	3.35	3.33	3.39
1941	1.69	1.41	5.50	5.32	3.27	3.76	4.43
1942	1.74	1.41	6.11	5.77	3.34	5.04	6.76
1943							
April	1.75	1.42	6.29	5.77	3.34	4.86	6.53
May	1.75	1.42	6.29	5.77	3.34	4.86	6.53
June	1.75	1.42	6.30	5.77	3.34	4.86	6.53
July	1.75	1.42	6.30	5.77	3.34	4.86	6.71
August	1.75	1.42	6.30	5.77	3.34	4.86	6.71
September	1.75	1.42	6.30	5.77	3.34	4.86	6.71
October	1.75	1.42	6.29	5.77	3.34	4.86	6.71
November	1.75	1.42	6.29	5.77	3.34	4.86	6.71
December	1.75	1.42	7.39	5.77	3.34	4.86	6.71
1944							
January	1.75	1.42	7.40	5.77	3.34	4.86	6.71
February	1.75	1.42	7.40	5.77	3.34	4.86	6.71
March	1.75	1.42	7.61	5.77	3.34	4.86	6.71
April	1.75	1.42	7.50	5.77	3.34	4.86	6.71
Index Numbers (1910-14 = 100)							
1922	113	90	173	132	117	140	142
1923	112	102	177	137	140	136	147
1924	111	86	168	142	145	107	121
1925	115	87	155	151	155	117	135
1926	113	84	126	140	136	129	139
1927	112	79	145	166	143	128	162
1928	100	81	202	188	173	146	170
1929	96	72	161	142	154	137	162
1930	92	64	137	141	136	112	130
1931	88	51	89	112	109	63	70
1932	71	36	62	62	60	36	39
1933	59	39	84	81	85	97	71
1934	59	42	127	89	93	79	93
1935	57	40	131	88	87	91	104
1936	59	43	119	97	89	106	121
1937	61	46	140	132	120	120	122
1938	63	48	105	106	104	93	100
1939	63	47	115	125	102	115	111
1940	63	48	133	124	110	99	96
1941	63	49	157	151	107	112	126
1942	65	49	175	163	110	150	192
1943							
April	65	50	180	163	110	144	186
May	65	50	180	163	110	144	186
June	65	50	180	163	110	144	186
July	65	50	180	163	110	144	191
August	65	50	180	163	110	144	191
September	65	50	180	163	110	144	191
October	65	50	180	163	110	144	191
November	65	50	180	163	110	144	191
December	65	50	211	163	110	144	191
1944							
January	65	50	211	163	110	144	191
February	65	50	211	163	110	144	191
March	65	50	217	163	110	144	191
April	65	50	214	163	110	144	191

Wholesale Prices of Phosphates and Potash**

	Superphosphate Baltimore, per unit	Florida land pebble 68% f.o.b. mines, bulk, per ton	Tennessee phosphate rock, 75% f.o.b. mines, bulk, per ton	Muriate of potash bulk, per unit, c.i.f. Atlantic and Gulf ports	Sulphate of potash in bags, per unit, c.i.f. Atlantic and Gulf ports	Sulphate of potash magnesia, per ton, c.i.f. Atlantic and Gulf ports	Manure salts bulk, per unit, c.i.f. Atlantic and Gulf ports[1]	Kainit, 20% bulk, per unit, c.i.f. Atlantic and Gulf ports[1]
1910–14	$0.536	$3.61	$4.88	$0.714	$0.953	$24.18	$0.657	$0.655
1922	.566	3.12	6.90	.632	.904	23.87	....	.508
1923	.550	3.08	7.50	.588	.836	23.32	....	.474
1924	.502	2.31	6.60	.582	.860	23.72	....	.472
1925	.600	2.44	6.16	.584	.860	23.72	....	.483
1926	.598	3.20	5.57	.596	.854	23.58	.537	.524
1927	.535	3.09	5.50	.646	.924	25.55	.586	.581
1928	.580	3.12	5.50	.669	.957	26.46	.607	.602
1929	.609	3.18	5.50	.672	.962	26.59	.610	.605
1930	.542	3.18	5.50	.681	.973	26.92	.618	.612
1931	.485	3.18	5.50	.681	.973	26.92	.618	.612
1932	.458	3.18	5.50	.681	.963	26.90	.618	.591
1933	.434	3.11	5.50	.662	.864	25.10	.601	.565
1934	.487	3.14	5.67	.486	.751	22.49	.483	.471
1935	.492	3.30	5.69	.415	.684	21.44	.444	.488
1936	.476	1.85	5.50	.464	.708	22.94	.505	.560
1937	.510	1.85	5.50	.508	.757	24.70	.556	.607
1938	.492	1.85	5.50	.523	.774	25.17	.572	.623
1939	.478	1.90	5.50	.521	.751	24.52	.570	.607
1940	.516	1.90	5.50	.517	.730	....	.573	....
1941	.547	1.94	5.64	.522	.779	25.55	.570	....
1942	.600	2.13	6.29	.522	.809	25.74	.205	....
1943								
April	.640	2.00	5.90	.535	.817	26.00	.210	....
May	.640	2.00	5.90	.535	.817	26.00	.210	....
June	.640	2.00	5.90	.471	.701	22.88	.176	....
July	.640	2.00	5.90	.503	.797	26.00	.188	....
August	.640	2.00	5.90	.503	.797	26.00	.188	....
September	.640	2.00	5.90	.503	.797	26.00	.188	....
October	.640	2.00	5.90	.535	.797	26.00	.200	....
November	.640	2.00	5.90	.535	.797	26.00	.200	....
December	.640	2.00	6.10	.535	.797	26.00	.200	....
1944								
January	.640	2.00	6.10	.535	.797	26.00	.200	....
February	.640	2.00	6.10	.535	.797	26.00	.200	....
March	.640	2.00	6.10	.535	.797	26.00	.200	....
April	.640	2.00	6.10	.535	.797	26.00	.200	....
Index Numbers (1910-14 = 100)								
1922	106	87	141	89	95	99	....	78
1923	103	85	154	82	88	96	....	72
1924	94	64	135	82	90	98	....	72
1925	110	68	126	82	90	98	....	74
1926	112	88	114	83	90	98	82	80
1927	100	86	113	90	97	106	89	89
1928	108	86	113	94	100	109	92	92
1929	114	88	113	94	101	110	93	92
1930	101	88	113	95	102	111	94	93
1931	90	88	113	95	102	111	94	93
1932	85	88	113	95	101	111	94	90
1933	81	86	113	93	91	104	91	86
1934	91	87	110	68	79	93	74	72
1935	92	91	117	58	72	89	68	75
1936	89	51	113	65	74	95	77	85
1937	95	51	113	71	79	102	85	93
1938	92	51	113	73	81	104	87	95
1939	89	53	113	73	79	101	87	93
1940	96	53	113	72	77	....	87	....
1941	102	54	110	73	82	106	87	....
1942	112	59	129	73	85	106	84	....
1943								
April	119	55	121	75	86	108	85	....
May	119	55	121	75	86	108	85	....
June	119	55	121	66	74	95	80	....
July	119	55	121	70	84	108	82	....
August	119	55	121	70	84	108	82	....
September	119	55	121	70	84	108	82	....
October	119	55	121	75	84	108	83	....
November	119	55	121	75	84	108	83	....
December	119	55	125	75	84	108	83	....
1944								
January	119	55	125	75	84	108	83	....
February	119	55	125	75	84	108	83	....
March	119	55	125	75	84	108	83	....
April	119	55	125	75	84	108	83	....

Combined Index Numbers of Prices of Fertilizer Materials, Farm Products and All Commodities

	Farm prices*	Prices paid by farmers for commodities bought*	Wholesale prices of all commodities†	Fertilizer materials‡	Chemical ammoniates	Organic ammoniates	Superphosphate	Potash
1922.....	132	149	141	116	101	145	106	85
1923.....	142	152	147	114	107	144	103	79
1924.....	143	152	143	103	97	125	94	79
1925.....	156	157	151	112	100	131	109	80
1926.....	145	155	146	119	94	135	112	86
1927.....	139	153	139	116	89	150	100	94
1928.....	149	155	141	121	87	177	108	97
1929.....	146	153	139	114	79	146	114	97
1930.....	126	145	126	105	72	131	101	99
1931.....	87	124	107	83	62	83	90	99
1932.....	65	107	95	71	46	48	85	99
1933.....	70	109	96	70	45	71	81	95
1934.....	90	123	109	72	47	90	91	72
1935.....	108	125	117	70	45	97	92	63
1936.....	114	124	118	73	47	107	89	69
1937.....	121	130	126	81	50	129	95	75
1938.....	95	122	115	78	52	101	92	77
1939.....	93	121	112	79	51	119	89	77
1940.....	98	122	115	80	52	114	96	77
1941.....	122	130	127	86	56	130	102	77
1942.....	157	152	144	93	57	161	112	77
1943								
April.....	185	165	151	95	57	160	119	79
May.....	187	167	152	95	57	160	119	79
June.....	190	168	151	93	57	160	119	69
July.....	188	169	150	94	57	160	119	74
August....	193	169	150	94	57	160	119	74
September.	193	169	150	94	57	160	119	74
October...	192	170	150	95	57	160	119	78
November.	194	171	150	95	57	160	119	78
December..	196	173	150	96	57	171	119	78
1944								
January....	196	174	150	96	57	171	119	78
February..	195	175	151	96	57	171	119	78
March.....	196	175	151	97	57	173	119	78
April.....	196	175	152	96	57	172	119	78

* U. S. D. A. figures.

† Department of Labor index converted to 1910-14 base.

‡ The Index numbers of prices of fertilizer materials are based on original study made by the Department of Agricultural Economics and Farm Management, Cornell University, Ithaca, New York. These indexes are complete since 1897. The series was revised and reweighted as of March 1940 and November 1942.

[1] Beginning with June 1941, manure salts prices are F. O. B. mines, the only basis now quoted.

**** The annual average of potash prices is higher than the weighted average of prices actually paid because since 1926 better than 90% of the potash used in agriculture has been contracted for during the discount period. From 1937 on, the maximum seasonal discount has been 12%.**

REVIEWS

This section contains a short review of some of the most practical and important bulletins, and lists all recent publications of the United States Department of Agriculture, the State Experiment Stations, and Canada, relating to Fertilizers, Soils, Crops, and Economics. A file of this department of BETTER CROPS WITH PLANT FOOD would provide a complete index covering all publications from these sources on the particular subjects named.

Fertilizers

¶ "Fertilizing Burley Tobacco" is the title of Kentucky Extension Leaflet 63 by P. E. Karraker, R. A. Hunt, and E. J. Kinney. It is brought out that a plentiful supply of plant food is necessary if high yields of good quality burley tobacco are to be obtained, and very few soils are naturally fertile enough to supply this plant food without the addition of fertilizer. While all the nutrients are necessary for a good crop, a lack of potassium is particularly serious since it reduces the quality and often permits the development of leaf diseases. The cost of providing ample nutrients is small compared to the value of the crop.

The authors state that most of the soils outside of the Inner Bluegrass region require phosphorus, usually at the rate of about 80 lbs. of phosphoric acid per acre. Potash will be needed as a fertilizer on all except the very fertile soils or where heavy applications of manure are applied. It is stated that potassium deficiency is a common cause of poor tobacco in the State, and 40 to 75 lbs. of actual potash per acre are recommended. For applications up to 40 lbs. of potash per acre, muriate of potash is satisfactory, but on all amounts above 40 lbs. of potash, sulphate of potash should be used for the additional supply. Except on fertile soils where good legume crops are turned under or where heavy applications of manure are made, nitrogen fertilizer will be needed, usually at the rate of about 50 lbs. of nitrogen per acre. Mixed fertilizers such as 6-8-6 or 4-10-6 at about 1,000 lbs. per acre can be used to supply the nutrients required. The authors admit that the recommendations call for somewhat heavier fertilization than is commonly used in Kentucky for tobacco, but where nitrogen and potassium are needed, the small amounts of these nutrients applied in 200 to 300 lbs. of fertilizer containing 4 per cent of either are not likely to do much good, and under these conditions it really pays to use higher applications of high-analysis fertilizer. It is recommended that the fertilizer be applied in bands along the row about 3 inches deep and 3 to 4 inches from the plant. For applications of more than 800 lbs. of fertilizer per acre part of the fertilizer should be applied in bands on the bottom of the plow furrow with the remainder at planting time.

¶ Practical information on fertilizers is briefly given in Kentucky Extension Leaflet 64 entitled "How to Apply and Use Fertilizers" by P. E. Karraker. The meaning of the guaranteed analysis is given and brief comments on why nitrogen, phosphorus, and potassium are required in fertilizers, as well as what they do to the crops on which they are applied. General suggestions on the selection of the proper grade of fertilizer for various crop and soil conditions together with suggestions on methods of application are included.

"Fertilizer and Other Experiments With Pimientos," Ga. Exp. Sta., Experiment, Ga., Bul. 231, Dec. 1943, H. L. Cochran.

"Wartime Fertilizer Recommendations," Ext. Section, Agron. Dept., Iowa State College, Ames, Iowa, Agron. 4, Jan. 1944.

"Fertilizing Burley Tobacco," Univ. of Ky., Lexington, Ky., Leaf. 63, Jan. 1944, P. E.

Karraker, Russell A. Hunt, and E. J. Kinney.

"How to Buy and Use Fertilizers," Univ. of Ky., Lexington, Ky., Jan. 1944, P. E. Karraker.

"Commercial Feeds, Fertilizers and Agricultural Liming Materials," State Insp. Serv., Univ. of Md., College Park, Md., Jan. 1944—No. 189.

"Fertilizer Recommendations for 1944 Crops," Mass. State College, Amherst, Mass., Sp. Cir. 95, (Rev.), Dec. 1943, Ralph W. Donaldson.

"Fertilizers for Cabbage, Peas, and Tomatoes," Miss. State College, Agr. Exp. Sta., State College, Miss., Bul. 397, Jan. 1944, E. L. Moore and J. A. Campbell.

"The Value of Fertilizer for Oats," Miss. Agr. Exp. Sta., State College, Miss., Cir. 115, Feb. 1944, Russell Coleman and T. E. Ashley.

"Inspection of Commercial Fertilizers for 1943," Univ. of N. H., Durham, N. H., Bul. 350, Oct. 1943.

"Commercial Fertilizers for Oklahoma Crops," Okla. Agr. Exp. Sta., Okla. A. & M. College, Stillwater, Okla., Bul. 279, March 1944, Horace J. Harper.

"The Explosion and Fire Hazard in Handling Ammonium Nitrate as a Fertilizer," U.S.D.A., Washington, D. C., Jan. 1944, R. O. E. Davis.

Soils

¶ An interesting series of experiments studying the influence of different levels of soil acidity on the growth of vegetables is reported in Arkansas Agricultural Experiment Station Bulletin 433 entitled "Influence of Varied Soil Reactions on Growth and Yield of Vegetable Crops on Newtonia Silt Loam and Ruston Fine Sandy Loam Soils" by V. M. Watts and J. R. Cooper. In general it was found that the crops tended to make best growth at reactions near the neutral point. Crops growing on the Newtonia soil seemed to require a higher pH for optimum growth than did similar crops on the Ruston soil. The crops involved were snap beans, cantaloupes, peas, Irish potatoes, sweet potatoes, tomatoes, spinach, and watermelons. This work again shows that potatoes, which usually are grown on an acid soil, really make best growth on a neutral soil when disease conditions are not an interfering factor. Studies on the germination of the seeds of tomatoes, cantaloupes, onions, beans, peas, and spinach showed little influence in pH level on germination, but in the case of cucumbers acidity was very important, since it appeared to be associated with the development of damping-off organisms so that at pH 6 or lower germination was improved.

The nitrate nitrogen, soluble phosphorus, and potash in the sap of tomato plants growing on the Newtonia soil at the different acidity levels were determined. Nitrate appeared to increase at the higher pH values, with the optimum usually over pH 7 but under pH 8. The highest content of soluble phosphorus was usually at pH levels near or slightly below the neutral point. There did not seem to be any great influence or consistency of the effect of pH level on the potassium content of the sap.

¶ An unusual type of bulletin and one that should be very helpful locally is No. 381 of the Mississippi Agricultural Experiment Station entitled "Soil Management Practices Recommended for Tunica County," by L. A. Davidson. A generalized soil map of the County is given with descriptions of the soil groups. General discussions on drainage, erosion, organic matter, nitrogen, liming, phosphorus, and potassium in relation to the conditions existing in the County are then given. Recommended cropping systems for the various soils and brief discussions on the management of each soil type complete the Bulletin. The particular county under consideration is in the northwest corner of the State bordering the Mississippi River. On most of the soils, lime is likely to be needed and organic matter and nitrogen will have to be added. Phosphorus is likely to be deficient on the acid soils, while potassium deficiency is most likely to occur on the sandy and low terrace soils. Cotton rust frequently is found on these soils, indicating their advanced stage of potassium deficiency.

"Organic Matter in Iowa Soils," Agr. Exp. Sta., Agr. Ext. Serv., Iowa State College, Ames, Iowa, Bul. P57, Nov. 1943, A. G. Norman.

"Run-Off from Small Agricultural Areas of Dunmore Silt Loam and Related Soils in the

Limestone Valleys and Upland Section in the Southeast," Va. Agr. Exp. Sta., Blacksburg, Va., T. Bul. 90, Nov. 1943, Emanuel Azar and David W. Cardwell.

"Forest-Land Utilization in Nicholas and Webster Counties, West Virginia," W. Va. Agr. Exp. Sta., Morgantown, W. Va., Bul. 309, July 1943, E. C. Weitzell and L. F. Miller.

"The Santa Cruz Area California," U.S. D.A., Washington, D. C., Series 1935, Nov. 25, Jan. 1944, R. Earl Storie, Ralph C. Cole, Bruce C. Owen, L. F. Koehler, A. C. Anderson, W. J. Leighty, and John L. Retzer.

"The Tracy Area California," U.S.D.A., Washington, D. C., Series 1938, No. 5, Dec. 1943, Ralph C. Cole, L. F. Koehler, F. C. Eggers, and A. M. Goff.

"Physical Land Conditions on the San Mateo County Soil Conservation District California," U.S.D.A., Washington, D. C., Phys. Land Survey No. 33, 1943, Robert S. Ayers.

"The Upper Musselshell Valley Area Montana," U.S.D.A., Washington, D. C. Series 1939, No. 1, Nov. 1943, F. K. Nunns.

Crops

¶ The Canadian Department of Agriculture each year makes a survey of plant diseases reported throughout the Dominion. In the "Twenty-Second Annual Report of the Canadian Plant Disease Survey, 1942" compiled by I. L. Conners and D. B. O. Savile, in addition to the reports of occurrences of diseases caused by organisms there are numerous reports of diseases or pathological conditions due to nutrient deficiencies. These are concerned mostly with potassium, manganese, boron, and magnesium. Potash deficiency is reported as being widely observed on clover growing in Prince Edward Island, while in another case it is reported that a grower who included potassium chloride in a spray, in the belief it would be helpful in retarding ascosphore development, damaged the foliage. Manganese deficiency on oats was reported in Quebec and magnesium deficiency on beans in New Brunswick. The reports of boron deficiency are numerous, except in those places where the use of boron has become so general as to prevent the development of deficiency symptoms. The crops on which boron deficiency is reported include mangels in Ontario; beets and cabbage in Quebec; cauliflower, celery, turnips, and apples in several provinces; lettuce in Prince Edward Island, and potatoes in New Brunswick.

¶ Suggestions on the control of cracking of sweet potatoes are given by L. G. Willis in North Carolina Agricultural Experiment Station Special Circular No. 1 entitled "Apply Borax to Improve Quality of Sweet Potatoes." Difficulty has been experienced by growers in this State when the crop was grown on fertile soils, and especially those that were well limed. Professor Willis found that the use of borax prevented cracking of the root and in addition improved the general quality of the sweet potato. This improved quality was in flavor and texture. It is suggested that where cracking has been bad in the past, 10 lbs. of borax per acre be used with 15 lbs. suggested on the heavy soils. Where the trouble has not been serious in the past, 5 lbs. per acre are recommended. The possibility of obtaining beneficial results by using borax at the rate of 1 ounce per 500 square feet in the beds also is suggested. Work to date indicates that much better results are obtained if the borax is applied previous to planting rather than as a top-dressing after the crop is up. Warning is given that heavy rates of application may be detrimental.

¶ "How to Fertilize Corn Effectively in Indiana" is the title of Bulletin 482 of the Purdue University Agricultural Experiment Station. In this, G. D. Scarseth, H. L. Cook, B. A. Krantz and A. J. Ohlrogge present their findings and conclusions in a rather unusual manner. Actual case histories of experimental fields over a three-year period covering very dry years and years of ample rainfall are given, and conclusions are drawn from these various cases. The teachings are then combined to form the general conclusion.

It is pointed out that at present in Indiana, nitrogen, phosphate, and potash are the nutrients most likely to be limiting in the production of corn. Lime and magnesium are usually taken care of in liming, sulphur is usually

added in abundant quantities as a component of other fertilizers, and boron is usually sufficient in the small quantities needed for corn on the acid soils in Indiana. The need for boron appears to be most noticeable on the heavily limed and alkaline soils, and the authors conclude that eventually this element also will be widely needed. In the Bulletin at hand, however, only the nitrogen, phosphorus, and potassium are considered. It is pointed out that the quantities of these nutrients required to make a 100-bushel crop would be 1,300 lbs. of a 10-10-10 fertilizer per acre, allowing for the usual fixation of about two-thirds of the phosphate added. When an ordinary application of 100 lbs. of a 3-12-12 fertilizer is given, over 90 per cent of the nutrients must come from the soil supply, if a 100-bushel crop is to be made. The authors state that therefore the ordinary fertilization can be considered only as a starter fertilizer and that if large yields are desired on ordinary soils, extra plant food will have to be applied. They also indicate that in the long run nutrients to replace those taken from the soil and not returned in the form of manure or crop residues will have to be added in fertilizers if the fertility of our soils is to be maintained.

Many interesting case histories are presented illustrating responses to applications of various combinations of plant food supplied in different ways. The importance of a proper balance of all three nutrients if maximum results are to be obtained is shown. An unbalanced fertilization not only may not give maximum yield, but may actually depress yields under some conditions by stimulating extra plant growth in the early part of the season and exhausting the available nutrients in the production of the plant so that nothing is left over for producing grain.

Extra plant food in the form of fertilizers such as 10-10-10 usually gave best results when applied in bands on the bottom of the plow-furrow. Broadcasting the fertilizer before plowing tended to mix it through the soil too much and did not permit its most effective utilization by plants. In a dry season with the fertilizer near the surface, the nutrients would tend to be above the zone of soil in which the roots could function. Surface application of fertilizer in a wet year is likely to result in stimulation of grass and weed growth which will be difficult to control if wetness prevents working of the soil. It would thus appear that deep placement of fertilizer is likely to give better results in years of unusual dryness or wetness. In years of favorable rainfall well distributed, the placement of the fertilizer is not so important. Of course, it is impossible to tell what the distribution and amount of rainfall will be when the corn is planted, so it would appear to be advisable to apply the fertilizer in bands on the bottom of the furrow. It is recommended that along with this fertilization, 100 lbs. of fertilizer at planting time be applied to give the corn a start. The omission of the starter fertilization results in a slow growth during the early part of the season. When the corn roots eventually get down to the fertilized zone, the plant will usually forge ahead quickly and largely overcome the effects of the slow start, but it usually is desirable that the rapid early growth be obtained.

The residual effects of the heavy application of fertilizers were highly beneficial on soybeans and oats.

While the heavy applications of fertilizer increased the cost of fertilization, increases in yields more than sufficient to pay for the added cost of the fertilizer were obtained and the favorable residual effects would be added to this.

The general conclusions are that in a good rotation of corn, legumes, and small grains, properly limed and with 300 to 400 lbs. of fertilizers such as 3-12-12 or 0-12-12 per acre used on the grains so that the ordinary corn yield was 70 to 80 bushels per acre, 200 lbs. of 3-12-12 fertilizer per acre in the drill or 125 lbs. per acre in the hill will be satisfactory for the corn. On soils very deficient in potash, extra potash should be applied for the small grains. If

corn yields are only 50 or 60 bushels per acre, an increase of 15 to 20 bushels may be obtained by the use of about 400 lbs. of 10-10-10 per acre plowed under, in addition to the fertilization at planting time, provided other factors are not limiting the growth of the corn. On poor soils where the yield is only 30 or 40 bushels of corn per acre, 800 lbs. of a 10-10-10 fertilizer per acre in addition to the fertilization at planting time are recommended, the heavy applications being placed on the bottom of the furrow. In cases where straw or carbonaceous organic matter is turned under on soils known to be high in phosphate and potash, 300 to 400 lbs. of nitrogen fertilizers such as cyanamid or ammonium sulphate per acre should be plowed under. On black soils and those deficient in potash, 200 lbs. of muriate of potash per acre should be plowed under in addition to using the ordinary fertilization at planting time. It is pointed out by the authors that by following the above practices greatly increased yields of corn can be obtained in a much shorter period of time than is required to gradually build up the fertility of the soil by moderate applications of fertilizers in the rotation.

Numerous excellent colored illustrations throughout this Bulletin add greatly to its attractiveness and very effectively emphasize many of the facts.

"Backyard Gardening," Ext. Serv., Ala. Poly. Inst., Auburn, Ala., Cir. 240, Feb. 1943, W. A. Ruffin.

"Crimson Clover for Grazing and Soil Improvement," Ext. Serv., Ala. Poly. Inst., Auburn, Ala., Cir. 254, June 1943, J. C. Lowery.

"Eight Point Milk-Production Program for 1944," Ext. Serv., Ala. Poly. Inst., Auburn, Ala., Cir. 267, Jan. 1943, F. W. Burns and J. C. Lowery.

"The Effects of Climate and Grazing Practices on Short-Grass Prairie Vegetation," Exp. Farms Serv., Swift Current, Sask., Publ. No. 747, T. Bul. 46, May 1943, S. E. Clarke, E. W. Tisdale, and N. A. Skoglund.

"War-Time Production Series, Sunflower Production for Grain," Agr. Supplies Board, Ottawa, Canada, Sp. Pamphlet 69, Oct. 1943.

"The Grape in Ontario," Ont. Dept. of Agr., Sta. & Publ. Branch, Toronto, Ont., Bul. 438, Feb. 1944, C. B. Kelly.

"Farm Science at War," Colo. Agr. Sta., Colo. State College, Fort Collins, Colo., 56th A. R. 1942-43.

"Growing Alfalfa in Colorado," Colo. Agr. Exp. Sta., Colo. State College, Fort Collins, Colo., Bul. 480, Aug. 1943, R. M. Weihing, D. W. Robertson, O. H. Coleman, and R. Gardner.

"Report of the Director for Year Ending October 31, 1943," Conn. Agr. Exp. Sta., New Haven, Conn., Bul. 477, Jan. 1944.

"Cotton Variety Tests in Georgia, 1938-1943," Ga. Exp. Sta., Experiment, Ga., Cir. 144, Jan. 1944, R. P. Bledsoe, W. W. Ballard, and A. L. Smith.

"Forest Planting on Illinois Farms," Univ. of Ill., College of Agr., Urbana, Ill., E. Cir. 567, Jan. 1944, J. E. Davis.

"Better Yields of Spring Oats With Better Varieties," Agr. Exp. Sta., Univ. of Ill., Urbana, Ill., Cir. 570, Jan. 1944, G. H. Dungan and O. T. Bonnett.

"Illinois Hybrid Corn Tests 1943," Agr. Exp. Sta., Univ. of Ill., Urbana, Ill., Bul. 500, Feb. 1944, G. H. Duncan, J. H. Bigger, A. L. Lang, Oren Bolin, and Benjamin Koehler.

"Raspberries and Blackberries," Purdue Univ., Dept. of Agr. Ext., Lafayette, Ind., E. Bul. 191 (3rd Rev.), Aug. 1943, Monroe McCown, J. J. Davis, and R. C. Baines.

"Soybeans in Indiana," Purdue Univ. Dept. of Agr. Ext., Lafayette, Ind., E. Bul. 231, (Rev.), Feb. 1944, K. E. Beeson.

"Report on Agricultural Research for the Year Ending June 30, 1943, Part I," Agr. Exp. Sta., Iowa State College, Ames, Iowa.

"Report on Agricultural Research for the Year Ending June 30, 1943, Part II," Agr. Exp. Sta., Iowa State College, Ames, Iowa.

"Iowa Corn Yield Test 1943," Agr. Exp. Sta., Iowa State College, Ames, Iowa, Bul. P58, Feb. 1944, Joe L. Robinson and Francis Reiss.

"Cropping and Soil Management for Burley Tobacco," Ky. Agr. Exp. Sta., Univ. of Ky., Lexington, Ky., Bul. 453, July 1943, P. E. Karraker and C. E. Bortner.

"Effect of Whole and Cut Seed on Stand & Yield of Irish Potatoes," Agr. Exp. Sta., Baton Rouge, La., Bul. 371, Nov. 1943, E. L. LeClerg.

"Ladino Clover," Me. Ext. Serv., Orono, Me., E. Cir. 172 (Rev.), Sept. 1943.

"Sweet Potato Production," Agr. Exp. Sta., Miss. State College, State College, Miss., Bul. 392, Sept. 1943, John W. Randolph and W. S. Anderson.

"The Apparent Digestibility and Nutritive Value of Several Native and Introduced Grasses," Agr. Exp. Sta., Mont. State College, Bozeman, Mont. T. Bul. 418, Oct. 1943, Ralph McCall, R. T. Clark, and A. R. Patton.

"Wartime Service to Montana Farmers and Ranchers," Agr. Exp. Sta., Bozeman, Mont., War Cir. 7, March 1944, F. M. Harrington and W. E. Pollinger.

"The Composition of Timothy," Agr. Exp. Sta., Univ. of N. H., Durham, N. H., T. G. Phillips, T. O. Smith, and R. H. Harper.

"Potato Growing in New Hampshire," Agr. Ext. Serv., Univ. of N. H., Durham, N. H. E. Bul. 45, Rev. Feb. 1943, Ford S. Prince, Paul T. Blood, Jay L. Haddock, J. G. Conklin, M. C. Richards, George M. Foulkrod, M. F. Abell, and L. A. Dougherty.

"Strawberry Culture," Univ. of N. H., Ext. Serv., Durham, N. H. E. Cir. 211, Rev. March 1943, L. P. Latimer.

"Trees for Victory," Ext. Serv., Okla. A. & M., Stillwater, Okla., OP-86, 1944, Harry P. Rigdon.

"Fall and Winter Pastures," Okla. A. & M., Stillwater, Okla., OP-87, 1944.

"Small Grains for Winter Pasture in Oklahoma," Okla. A. & M., Stillwater, Okla., OP-89, 1944, Wesley Chaffin and Hugo Graumann.

"Local, Domestic and Foreign Red Clover Seed," Agr. Exp. Sta., State College, Pa., Bul. 458, Nov. 1943, H. B. Musser and J. K. Thornton.

"Cache, A Beardless, Smut-Resistant Winter Wheat," Agr. Exp. Sta., Utah State Agr. College, Logan, Utah, Bul. 312, 1944, R. W. Woodward and D. C. Tingey.

"Tomato Production in Utah," Utah Agr. Exp. Sta., Logan, Utah, Cir. 120, March 1944, H. L. Blood, L. H. Pollard, H. B. Peterson, and W. E. Peay.

"The Production of Sun-Cured Tobacco in Virginia," Va. Agr. Exp. Sta., Blacksburg, Va., Bul. 356, Nov. 1943, W. W. Green.

"Growing Green Feed for Poultry," Agr. Ext. Serv., State College of Wash., Pullman, Wash., E. Bul. 310, Feb. 1944, A. G. Law, E. J. Kreizinger, and I. M. Ingham.

"The How of Your Eight Point Dairy Program for 1944," Agr. Ext. Serv., State College of Wash., Pullman, Wash. E. Cir. 72, Feb. 1944.

"Report on the Agricultural Experiment Station, 1942," U.S.D.A., Washington, D. C.

"Report on the Agricultural Experiment Station, 1943," U.S.D.A., Washington, D. C.

"Eight Point National Milk-Production Program 1944, U.S.D.A., Washington, D. C. AWI-83, Jan. 1944.

"Soybean Projects of the State Agricultural Experiment Stations, 1944," U.S.D.A., Washington, D. C., Feb. 1, 1944.

Economics

A helpful and highly practical almanac for farmers in North Carolina has been compiled by R. W. Shoffner, H. B. James and C. B. Ratchford in "North Carolina Farming Guide," issued as North Carolina Agricultural Extension Circular 263. Suggested work and plans on the farm are given for each month of the year. These are broken down into the various phases of farming operations such as field crops, fruits and vegetables, livestock, poultry, and where desirable, further subdivided by sections of the State. In addition to a great deal of helpful information and valuable suggestions and recommendations, numerous tables which cover spray schedules, units of measurement, feeding values, rates of seeding, and other similar material are included. This booklet with its timely and helpful hints and suggestions should be in the hands of every farmer of North Carolina and will also be found useful by farm advisers in other states.

"Adjustments in Farm Organization for Increasing Farm Income in Hempstead County," Agr. Exp. Sta., Fayetteville, Ark., Bul. 442, June 1943, W. R. Horlacher and C. O. Brannen.

"Extracts from the Agricultural Code of California," State of Calif., Dept. of Agr., Sacramento, Calif., Rev. to Aug. 4, 1943.

"Some Additional Lattice Square Designs," Agr. Exp. Sta., Iowa State College, Ames, Iowa, Res. Bul. 318, May 1943, W. G. Cochran.

"The Kansas Agricultural Outlook for 1944," Kansas State College, Ext. Serv., Manhattan, Kansas, E. Cir. 173, Dec. 1943.

"Soybean Production in the Louisiana-Mississippi Delta Area," Agr. Exp. Sta., La. State Univ., Baton Rouge, La., Bul. 369, Oct. 1943, Frank D. Barlow, Jr.

"Sugarcane Production in Mississippi," Agr. Exp. Sta., Miss., State College, State College, Miss., Bul. 395, Nov. 1943, I. E. Stokes and T. E. Ashley.

"Farm Size and Its Relation to Volume of Production, Operating Costs, and Net Returns; Central and Southern Nebraska, 1930-39," Agr. Exp. Sta., Univ. of Nebr., Lincoln, Nebr., Bul. 349, Dec. 1943, W. L. Ruden and H. C. Filley.

"The Agricultural Outlook for 1944," Agr. Ext. Serv., Ohio State Univ., Columbus, Ohio, No. 191, Nov. 1943.

"Successful Cooperative Cotton Gin Associations in Texas," Texas Agr. Exp. Sta., College Station, Texas, Bul. 636, July 1943, W. E. Paulson.

"Food & Bullets Fight Together," Agr. Ext. Serv., Univ. of Vt., Burlington, Vt., Brieflet 694, Feb. 1944.

"Statistics of Farmers' Marketing and Purchasing Cooperatives 1942-43 Marketing Season," U.S.D.A., Washington, D. C., Misc. Rpt. No. 70, Jan. 1944, Grace Wanstall and R. H. Elsworth.

"An Analysis of the Agricultural Situation in the Wasatch Front Area Resulting from War and Post-War Changes," Agr. Exp. Sta., Utah State Agr. College, Logan, Utah, Reprint

No. 520, June 1943, W. P. Thomas, G. T. Blanch, R. J. Evans, D. S. Jennings, L. Wilson, O. W. Israelsen, L. A. Stoddart, and C. W. Cook.

"Agricultural Statistics 1943," U.S.D.A., Washington, D. C.

"Report of the Director of the Food Distribution Administration 1943," War Food Administration, U.S.D.A., Washington, D. C., Oct. 15, 1943.

"Food Program for 1944," War Food Administration, Washington, D. C.

"What Post-War Policies for Agriculture?" U.S.D.A., Washington, D. C., Jan. 1944.

"Agriculture When the War Ends," U.S. D.A. Washington, D. C., Oct. 15, 1943.

"World Needs for U. S. Fiber and Tobacco," U.S.D.A., Washington, D. C., Jan. 1944, Bennett S. White, Jr. and Horace G. Porter.

"Index Numbers of Prices Received by Farmers, 1910-1943," U.S.D.A., Washington, D. C., Feb. 1944.

"Annual Report on Tobacco Statistics 1943," U.S.D.A., War Food Administration, Washington, D. C., Dec. 1943.

"Report of the Manager of the Federal Crop Insurance Corporation, 1943," U.S.D.A., Washington, D. C.

Ploughs and Politicks

(A Book Review)

AN interesting and significant contribution to colonial Americana and history of early American agriculture has been written and compiled by Carl Raymond Woodward in Ploughs and Politicks (Rutgers University Press, New Brunswick, N. J., 1941. $5.00.) The author was attempting to establish the location of the farm in Burlington County, New Jersey, which historians and biographers claimed Benjamin Franklin owned. In this search, by fortuitous circumstances, there came into Mr. Woodward's hands an old English agricultural book containing numerous references and notes on American agriculture before the Revolution. Further search showed that these notes were by Charles Read, an important local figure in the pre-Revolutionary New Jersey. They established rather definitely that the farm allocated Benjamin Franklin by historians really was that of Charles Read. Out of this old agricultural book and notes, and further search among old records, the author has fashioned this interesting book.

The first half of Ploughs and Politicks is devoted to a biography of Charles Read, while the second half is a compilation of his agricultural notes with numerous enlightening commentaries by the author. Charles Read was a remarkable character, who participated in an unusually large range of enterprises, any one of which could well have taken the entire energies and lifetime of a man. He was a merchant, farmer, ironmaster, soldier, politician, jurist, and statesman. He was no dilettante in these activities, except possibly in his soldiering. In addition to numerous minor political offices, he was Secretary of the Province, and Acting-Governor for a while, Speaker of the Assembly, Indian Commissioner, Chief Justice of the Supreme Court, and apparently the most influential and important political figure of New Jersey in the period just prior to the Revolution. He was an active and successful business man with a deep interest in agriculture. On his farm he conducted numerous experiments and made many significant observations which he carefully recorded with the thoroughness of a scientist. The end of this brilliant career was marked by failure, tragedy, and oblivion.

Mr. Woodward has arranged the agricultural notes into chapters by subject matter. The titles of the seven chapters are The Husbandry of the Soil, The Husbandry of Plants, The Husbandry of Animals, The Husbandry of Bees, Farm Structures and Farm Implements, The Husbandry of the Household, and Fisheries. Much

attention was given to the use and care of manure, to liming, crop rotation, the growing of such legumes as alfalfa, clover, sainfoin and trefoil for hay and seed, buckwheat, corn, wheat, millet, rye, fruits, most of the vegetable crops we now know and many crops no longer thought of in connection with New Jersey agriculture such as rice, indigo, millet, hemp, and flax. Calculations on the production of animals, and how to care for and feed them are given. Reflecting lack of modern refrigerating appurtenances, directions are given for summer curing of meats, the conversion of milk to cheese products, and the destruction of skippers in a cheese. The chapter on bees shows the importance attached to them in colonial times. Many practical and amusing suggestions are given in the chapters on farm structures and household economy. Recipes are given for making various dishes and drinks, soaps, clothing, and the safe removal of skunks from the cellar.

The book is written in an interesting and readable style, and is well printed and bound. It can be recommended for reading on history and agriculture. It cannot help but impress the reader with the fact that our forebears knew considerable about agriculture, even subjects we are likely to pride ourselves with developing, but which perhaps we are only rediscovering or refining.

Southern Crops Show Need of Potash

(*From page* 17)

plots ripened evenly, while the untreated plots had a tendency to yellow around the edge of the leaf before the leaf ripened in the center. Two of the farmers reported that the leaves on the treated plots would not wilt down nearly so soon in the heat of the day as the untreated plots. On the farm of V. L. Anderson we could find no difference in the treated and untreated plots. However, the field has been heavily manured for five straight years. Three of the farmers using potash were sold on the results."

From the Assistant County Agent in Jefferson county comes this report: "Applications of potash made on tobacco were on land in a high state of cultivation on which stable manure had been applied and on which an application of complete fertilizer had been made. The results were particularly noticeable in the continued greenness of the lower leaves on the stalks and the uniformity in maturity of the whole plant."

The Assistant County Agent in Houston, a Middle Tennessee dark fire-cured tobacco county, writes: "Check—Poor Crop—contained very little oil and about 15 per cent of crop was left in the field as being too poor to pay the harvesting cost. Potash—Yielded 50 per cent more. All was cut and contained a normal to heavy amount of oil and was a fairly heavy bodied tobacco."

Other dark-tobacco reports indicating increased yields are numerous. T. O. Hudgens reported to J. Ben Thomson, Agent in Cheatham county: "Five average tobacco plants from treated rows weighed 55 pounds green. Five similar plants from untreated rows weighed 37½ pounds."

The Agent in Pickett, an Upper Tennessee burley tobacco county, reports: "Not so much difference in yield but withstood drought much better where potash applied. Also tended to stay green down to bottom, while ripening."

M. N. Manley, Agent in Roane

county, secured some very interesting results on nine tobacco demonstrations. He reports from 100 to 450 pounds increase in yield and stated that the portion treated with potash was "much more vigorous in growth and had larger leaves. It also cured up a lighter color and showed no disease at all."

Conclusions: These demonstrations have shown clearly that: (1) At present prices, many Tennessee farmers, and in particular tobacco growers, are not using sufficient quantities of potash for the most profitable production; (2) Soils formerly found to be well supplied with available potash for the production of our more common field crops may now be deficient, and on such soils the deficiency is related to the cropping history; (3) As potash becomes more important in the fertlizer program in Tennessee, the methods used by farmers for applying the material to crops must be improved to avoid seed injury and consequent negative results even where potash deficiency is serious.

More About Soybean Fertilization

(*From page* 10)

Fig. 3. The residual effect of fertilizer plowed under for the preceding corn crop on the growth of soybeans in 1943. Vigo silt loam soil, Cloverdale, Indiana. (See Table 6 for details of treatments.)

plots received three tons of ground limestone per acre and were then plowed and planted to Dunfield soybeans in order to determine the effect of the residual corn fertilizer on soybean yields.

During the 1943 growing season, considerable differences in the growth of the beans on various plots were evident. Some of these differences are seen in Figure 3 which shows 10 plants selected at random from various plots on September 11.

A comparison of the 1943 soybean yields with the 1942 corn yields and fertilizer treatments (Table 6) indicates a considerable response in bean yields to plant food left over from that applied to the preceding corn crop. The maximum yield obtained in 1943 was 22.4 bushels per acre (plot 6) where 2,000 pounds of 8-8-8 per acre were placed in the plow furrow for corn. This is almost double the yield of 11.6 bushels which was obtained on the unfertilized check plot (plot 1).

Thus, here again we have considerable evidence that soybeans are very capable of utilizing plant food remaining after heavy applications made to the preceding crop.

TABLE 6.—THE RESIDUAL EFFECT OF FERTILIZERS APPLIED TO CORN IN 1942 ON THE YIELD OF SOYBEANS IN 1943. VIGO SILT LOAM, VIRLEY GREENLEY FARM, CLOVERDALE, INDIANA.

Treatment	Pounds of N, P_2O_5 and K_2O applied on the plow sole [2]	1942 corn yields [1] (bushels per acre)	1943 soybean yields (bushels per acre)
1.....	None	17.3	11.6
2.....	0– 80– 80	13.9	15.0
3.....	40– 80– 80	34.4	19.8
4.....	80– 80– 80	45.3	16.6
5.....	160– 80– 80	63.7	20.0
6.....	160–160–160	70.3	22.4
7.....	80– 0– 80	41.4	14.0
8.....	80– 80– 0	50.5	16.2
9.....	80– 80– 80 [2]	35.4	21.0
Significant difference....		10.8	3.0

[1] Corn received a starter fertilizer of 100 pounds per acre of 3-12-12 in the row.
[2] The treatment 9 fertilizer was broadcast and plowed under for the corn.

Summary and Conclusions

From the above data, it is shown that: (1) the soybean crop can be fertilized directly, and (2) this crop has the ability to recover plant food which remains in the soil after heavy fertilization of the preceding crop, usually corn.

Therefore, our recommendations for fertilizing soybeans in Indiana include:

1. Lime all acid soils at the rate recommended for red clover. Do not attempt to grow soys on acid land without lime. Inoculate all soybean seed.
2. Where soybeans are drilled in rows for cultivation, apply 150 pounds per acre of 0-20-20 or 250 pounds 0-12-12 in the row with a divider fertilizer attachment.
3. On soils low in productivity, where corn yields average less than 40 bushels per acre, plow under 300 pounds per acre of 0-20-20 or 500 pounds of 0-12-12.
4. On potash-deficient soils, plow under 500 pounds per acre of 0-9-27 per acre.

Literature Cited

1. Enfield, G. H., *More Soybeans, Please.* Better Crops With Plant Food. Vol. 27, No. 7, pages 23-25, 48-49. August, 1943.
2. Scarseth, G. D., and Cook, H. L., Krantz, B. A., Ohlrogge, A. J., *How to Fertilize Corn Effectively in Indiana.* Purdue University Agriculture Experiment Station, Bul. 482 (1943).

The Use of Fertilizer in Maryland

(*From page* 24)

fertilizer grades are averages and there may be many instances where the grade recommended is not the best one to use for a specific condition. However, for the majority of cases the grades recommended have proven to be quite satisfactory. There have been times such as in 1942 and 1943 when, because of shortages of nitrogen and potash, the most suitable grades may not have been recommended. Our present appreciation of the need for food and feed crops indicates that this may not have been the best way out of this difficulty. It appears now as if we should have insisted that all recommendations be based on experimental evidence and that more stress should have been put on maintaining production of the essential fertilizer materials. If the increased demand for feed and food is to be met, the safest course would seem to be to

get on the basis of research recommendations as quickly as possible and stay on it.

Along with fertilizer grade recommendation for specific crops is given the quantity per acre to use. This was based on experimental evidence accumulated over a long period of years and for the soils best suited for the respective crops. In order to arrive at some idea regarding fertilizer use in Maryland, the average fertilizer rates per acre, as near as could be estimated, and the approximate acreage for the principal crops in Maryland were assembled, as reported here in Table 1. This table contains, also, the average yield and total production for these crops in the State. It must be recognized that the average rate per acre and the acres fertilized are largely a guess, because there is no way in which these can be accurately determined. However, the assumed rate should not be too far off because the total tonnage for the different grades obtained by these calculations is very close to that reported by the control chemist as sold.

It will be noted that the general field crops and pasture, or the crops which are used largely for animal food, have not been extensively fertilized. Animal food could be greatly increased by fertilizing more acres as well as by using more fertilizer on the acres already fertilized. The crops which produce food for man are seldom planted without fertilization, or they follow a heavily fertilized crop such as lima beans following peas. Even these crops, on the average, are not fertilized with anywhere near the maximum for the best production as indicated by experimental tests. It would seem as if the food and feed production in Maryland could be greatly increased by the use of more and better fertilizer.

In order to have an estimate of how much food production might be increased by a better use of fertilizer, the same crops as used in Table 1 are used for Table 2. In the latter table, these crops are supposedly treated with better grades and greater quantity of fertilizer. Conservative yields, as obtained from experimental tests, are used as the average yields and to indicate the total food production. In some cases the acreage figure has been changed to correspond both with the farmer's crop preference and his soil adaptation or a return to normal soil uses instead of the crop-control basis. It can be noted that the anticipated returns by such practice should produce much more food for both man and animal.

TABLE 1.—THE CROP ACREAGE, ACRES FERTILIZED, AMOUNTS OF FERTILIZER USED, AND YIELDS OF THE IMPORTANT FEED AND FOOD CROPS OF MARYLAND

Crops	State acreage	Probable acres fertilized	Probable plant food used per acre (pounds)	Average State yield in bu. or tons	Total production for the State bu. or tons
Corn	454,000	204,000	40	36.0 bu.	16,343,000
Barley	86,000	83,000	54	27.5 bu.	2,365,000
		8,000[1]	20(N)	6.0 bu.	48,000
Wheat	307,000	240,000	50	19.5 bu.	5,986,000
		10,000[1]	16(N)	5.00 bu.	50,000
Soybeans	100,000	60,000	55	15.5 bu.	1,550,000
Pasture	200,000	60,000	50	0.60 tons	120,000
Beans, lima	5,700	2,400	110	0.57 tons	3,250
Beans, snap	17,500	17,000	143	1.50 tons	26,250
Peas	15,500	15,000	120	0.60 tons	9,300
Potatoes	19,000	19,000	200	103.0 bu.	1,957,000
Sweet potatoes	8,000	8,000	270	180.0 bu.	1,440,000
Sweet corn	50,000	50,000	84	2.30 tons	115,000
Tomatoes	70,000	70,000	147	5.00 tons	350,000

[1] Spring top-dressing.

TABLE 2—THE INFLUENCE OF ADEQUATE FERTILIZATION ON THE EXPECTANCY IN CROP PRODUCTION OF THE IMPORTANT FEED AND FOOD CROPS OF MARYLAND

Crops	Acres which may be fertilized	Suggested pounds of plant food per acre	Average expected yield per acre	Probable total food production	Probable increase in food produced	
					bu. or tons	Percentage
Corn	480,000	60	42.0 bu.	20,160,000	3,817,000	23
Barley	70,000	70	32.0 bu.	2,240,000	−125,000	
	30,000[1]	20(N)	6.0 bu.	180,000	132,000	
					7,000	0.3
					55,000	2
Wheat	340,000	60	23.5 bu.	7,990,000	2,004,000	33
	160,000[1]	20(N)	5.0 bu.	800,000	800,000	
					2,804,000	47
Soybeans	100,000	77	18.0 bu.	1,800,000	250,000	16
Pasture	200,000	100	0.90 tons	180,000	60,000	50
Beans, lima	6,000	143	0.63 tons	3,790	540	17
Beans, snap	17,500	176	1.65 tons	28,875	2,625	10
Peas	15,500	160	0.70 tons	10,850	1,550	17
Potatoes	22,000	250	110.0 bu.	2,420,000	463,000	23
Sweet potatoes	9,000	288	190.0 bu.	1,710,000	270,000	19
Sweet corn	50,000	126	2.50 tons	125,000	10,000	9
Tomatoes	70,000	210	6.00 tons	420,000	70,000	20

[1] Spring top-dressing.

These heavier rates of fertilization are not believed to be impracticable, as there are many farmers who are using as much as twice the quantity of fertilizer suggested in this table for some of these crops. Of course, it must be recognized that some farmers, because of their management practices, equipment, and experience, are in better position to use heavier rates of fertilization than other farmers. Probably there are many farmers who could not and should not use the fertilizer rates suggested in Table 2. However, under the present conditions many farmers could use advantageously some fertilizer where they are using none at the present. From the food production standpoint many farmers could increase the quantity used per acre very satisfactorily. It is necessary to point out here that many farmers already fertilizing liberally should not use more fertilizer per acre than they are now using unless they modify their methods of application. If the fertilizer is applied in the row, as is usually the practice, the quantity per acre should not be increased unless by means of split applications. The results of fertilizer tests indicate that it is probably better to apply one-half to two-thirds of the fertilizer in a band on the plow sole or broadcast before plowing and plowed down, with the remainder in bands at each side of the row especially when heavier than normal rates per acre are used.

The amount of plant food given in Table 1 amounts to approximately 136,000 tons of fertilizer. The suggested tonnage as shown in Table 2 is approximately 296,000 tons. The largest increase in fertilizer usage would be for pastures, corn, and small grains or animal food. These three crops probably could use very economically for greater food production twice the amount of fertilizers now used. The man-food crops would probably respond profitably to the use of approximately 50 per cent more fertilizer. Some might

question the advisability of Maryland farmers trying to use 100 per cent more fertilizer; however, it does not seem unreasonable to expect that the Maryland farmer could use 50 per cent more fertilizer under the present emergency conditions if it were available to him.

As is characteristic where prices are good, the Maryland farmer has automatically increased his fertilizer use every year since 1940. This increase has been approximately 10 per cent each year. This has no doubt accounted for the favorable production in Maryland even under some very adverse weather conditions. Unfortunately, during the last two years the farmer has not been able to obtain the fertilizer grades experimental evidence has indicated he should use, and oftentimes not the quantity he desired. It is believed that he will be able to meet his quota of food and feed production and probably increase it even with his limitation in labor and machinery if he is able to secure a sufficient quantity of the desired fertilizer grades. Experience has shown that the farmer will generally arise to the demands of the occasion if given a chance. The most feasible way for him to do his part now would seem to be through the use of more and better fertilizers, provided they are applied in such a manner as to insure their most efficient utilization by farm crops.

They Who Work on These Crops

(*From page* 20)

upon to do a large share of the harvesting may require a second consideration of what wages to offer.

Apparently even more vigorous efforts will be required to get as many as will be needed for the farm work this summer and fall, for many of the boys who helped last year will have gone into the armed services. Last year's experience provides some basis for estimating the size of the task we face and the most likely sources of the extra help.

The largest group of seasonal workers will evidently come from housewives, students, and older men who

These boys got time off from their studies to help nearby farmers plant their crops.

were not working anywhere for pay in midwinter. But many of the boys in this group will go into the armed forces instead.

Special recruiting programs may be necessary to bring out more of the women who are now doing only their housework and more school girls. These two groups probably offer the largest source of labor for fairly short periods. Victory Farm Volunteers will undoubtedly try to bring even more youths than ever before into the farm working force.

Local townspeople may form another promising group. Emphasized campaigns to enlist them for short but critical periods of the harvest in certain areas may be necessary. Men and women, boys and girls, who give their vacations and other short periods to farm work may help a lot, particularly in localities where highly perishable crops are being harvested.

Seed Production of Hairy Vetch and Other Winter Cover Crops

(*From page* 26)

In considering the possible need for winter cover crop seed, it should be pointed out that but a small fraction of the cultivated acreage in this region is planted to winter cover crops at the present time. If seed were available in greater quantity and at lower prices, the picture would doubtless change. To encourage the extended use of cover crops in the South, where winter cover crops are now most used and most needed, cheaper seed from outside sources or increased local production seems necessary.

Production of winter cover-crop seed in the South will have to be limited to the few crops that mature seed early and thus avoid unfavorably hot weather. Blue lupines, wild winter peas, crimson clover, monantha vetch, narrowleaf vetch, and spotted burclover are good bets.

Spotted burclover, wild winter peas, and narrowleaf vetch have hard seed that make it possible to volunteer these crops for several years without reseeding, thus reducing the cost of seeding. When once established, spotted burclover will volunteer four good crops from one seed crop, and wild winter peas and narrowleaf vetch can be depended upon for a similar performance. An early maturing vetch that is as yet but little known, but which should receive more consideration for use in this fashion, is the so-called big-flowered vetch, Vicia grandiflora. By taking advantage of these naturally volunteering crops and paying more attention to the harvesting and storage of seed of other winter cover crops adapted to the South, this region can in good part take care of its own winter cover crop seed needs. In the Pacific Coast States and other parts of the country where cover crops are used, no serious problems in seed production are presented.

Just Doped!

(*From page* 5)

Cyrus Field and General Dodge, the former monkeying around with an Atlantic cable system, and the latter engineering the Union Pacific. Quite by accident in their maudlin maneuvers they finished a system of overseas communication on one hand and a transportation link on the other that made a

steel pathway for tired European refugees to settle the continent and get comatose on its dangerous dope.

Pioneer Americans were great talkers, especially the women, but they had to have stout lungs and masterful larynxes to get their neighbors out of bed when the house was afire. Not being able to talk any great distance cost them a lot of shoe leather and fried chicken from frequent visiting around. So as to avoid this overhead and make for quicker dating and easier gossiping, a feeble-minded dopester named Alexander Graham Bell devised a method of conveying speech and sound by electricity. Other dopes took hold afterwards and set up switchboards, loading coils, and multiple wire cables to perfect this lazy American way of scattering loose talk. Silence was at last shattered in the wilderness and the hermits had to move again—all because of the nasty habit Americans had of taking sedatives.

When my progenitors came here hunting for more morphine, the land was full of quill-pen and pencil pushers and offices were cluttered with clerks and waste paper. A merchant spent hours figuring his cost accounts and it took half a dozen good penmen to carry on his correspondence with customers. But there's always some American doper on hand to do something rash, so Chris Sholes of Milwaukee teamed up with Jim Densmore, who furnished the jack to buy him cocaine, and they launched what was called a "typewriter." This led to a brace of other nuisances hatched by other drug users, such as the check writer, calculating machine, and the addressograph. Literature, such as it is, also owes much to those early opium smokers, as each whack I give to this ancient keyboard proves.

LACK of illumination was a pest to the patriots in yonder times. No end of marauders, villains, and cutthroats roamed the countryside and milking cows and currying horses were no joke in a black, old barn. Shows were pretty feeble affairs without bright spotlights, and making change in church was darned risky in dim aisles. You'd never guess that a peanut butcher running on a slow train between Detroit and Huron could smuggle enough dope to inspire a brain storm that led to manufacture of the carbon filament and the modern Mazda. But Thomas Alva wasn't the only guy with a taste for drugs, and later on came Nikola Tesla and Charlie Steinmetz, two imported specimens with a flair for dope, who established transmitting systems with alternating current enough to save heaps of eyesight and prevent many murders.

URBAN dwellers were also having their troubles with crowded tenements and slow buses. Just as they were about ready to quit and even go to Germany in desperation, along came another chap with a hankering for bromides, named Frank J. Sprague. He dipped into his stock of smoke and drew out electric traction, geared motor suspension, and multiple unit train controls, thus making suburban homes possible and healthier kids a certainty.

News was not news in early days. It was history before most folks got wise to it. Our folks went west without much reading matter except the Bible and Doc Jaynes's pain-killing almanac. It was slow work hauling hand presses so far into the hinterlands, only to be thrown into the creek by some enraged political opponent. Finally a means was found to lower costs and print more news digests and medicine ads through the invention of a fearful looking machine which only a dope fiend could have devised. So James O. Clephane, a Washington senate stenographer, and Ottmar Mergenthaler, plain mechanic, threw together a contraption which was christened the "linotype" by Whitelaw Reid of the Tribune in 1886. Wiseacres tell me that today this machine has matrices cut in seventy languages, including Sanskrit and Hindi—possibly German too, you never can tell. Thus the effects of a strong poison spreads a lot.

Two rube inventions capped the climax of this orgy of drugging. One was uncorked by Cyrus H. McCormick, a queer blacksmith gent from Virginia, replacing the scythe and the cradle in harvesting grain; and the other madcap stunt was a cheap and rapid way to manufacture smooth and barbed wire, by Ichabod Washburn of Massachusetts and Jacob Haish of De Kalb, Illinois—both contributing to the fenced range and the full stomach. So you see the farmers and their friends were not temperate either, and they hit the hooch like Hades.

OH, you could run on with a list as full of freaks as Ringling Brothers, all the scientific and mechanical marvels which madmen under the influence of this American sedative have set loose upon a suffering world. And the worst of it is that a major share of these gadgets have been adopted and used by the Elite Guardsmen themselves.

But I don't have to go back into family history to retail the effects of this pernicious doping habit on the local scene. Even in my time (which is longer back than it is forward) I can recite some of the changes that have taken place, thanks to the prevalent custom of "taking snow."

When I was in knee pants we did not have the following "ordinary" things:

On the farms—No hay loaders, tractors, gang plows, side delivery rakes, power sprayers and cultivators, corn binders and pickers, hay balers, forage choppers, fan blowers, elevators, electric motors, automatic pumps and storage batteries, motor trucks, grain combines, soil tests, and lime and fertilizer distributors.

In the homes—No electric lights and irons, refrigerators, vacuum cleaners, mechanical washers and dish washers, linoleum, telephones, radios, pressure cookers, garbage incinerators and collectors, daily mail service, bottled pasteurized milk, frozen foods, and tropical fruits.

In the schools—No library, furnace, uniform lighting, home economics, manual arts, hot lunch, supervised teacher training, and organized recreation.

Of course, no fling into the realms of change would be complete perhaps unless one told about the revolution in church and social environment, and in the field of music, art, and literature. Here too one could demonstrate nicely that America has been a retreat and a nesting place for all kinds of "irresponsible neurotics" who like their drugs far too well. But pardon me for not encroaching upon the sacred fields of metaphysics and sociology, theology and spirituality.

I hesitate to mention any such intangible and unworldly subjects within the space allotted me, and also for quite a special reason.

The Nazi mind cannot comprehend any references to the higher strata of the heart and intellect, and it's only in matters material and mundane and "practical" that we can meet them on understandable ground.

BUT I think that America need not dodge the issue which the Elite Guards raise. Our own progress in these affairs which they envy and appreciate (by this time all too clearly and forcibly), must show them that we have not been partakers of Nirvana in vain, or opium eaters for nothing. Maybe we did indulge in an American Dream, hugging it to ourselves too long while the world lost step. But as for the drug-like effect of the era after this war is over, don't lay awake fretting over it in America. There won't be any coma then. It will be realism with a rush, and then some! Plus what we have found out about our slippery relatives in Europe! And maybe that, too, will be forgotten before it should be.

So until midsummer, sometime between hay and harvest, we bid you adieu. Meanwhile, please pass the novocaine.

AVAILABLE LITERATURE

The following literature on the use of fertilizers in profitable soil and crop management is available for distribution. We shall be glad to send these upon request and in reasonable amounts as long as our supply lasts.

Circulars

Tomatoes (General)
Asparagus (General)
Vine Crops (General)
Sweet Potatoes (General)
Fertilize Potatoes for Quality and Profits (Pacific Coast)
Fertilizing Small Fruits (Pacific Coast)
Better Corn (Midwest) and (Northeast)
Fertilize Pastures for Better Livestock (Pacific Coast)
Of Course I'm Interested (Pastures, Canada)
Meet the Family (Canada)

Reprints

T-8 A Balanced Fertilizer for Bright Tobacco
N-9 Problems of Feeding Cigarleaf Tobacco
T-9 Fertilizing Potatoes in New England
F-3-40 When Fertilizing, Consider Plant-food Content of Crops
J-4-40 Potash Helps Cotton Resist Wilt, Rust, and Drought
S-5-40 What Is the Matter with Your Soil?
K-4-41 The Nutrition of Muck Crops
Z-9-41 Grassland Farming in New England
BB-11-41 Why Soybeans Should Be Fertilized
EE-11-41 Cane Fruit Responds to High Potash
HH-12-41 Some Newer Ideas on Orchard Fertility
B-1-42 Growing Ladino Clover in the Northeast
E-2-42 Fertilizing for More and Better Vegetables
F-2-42 Prune Trees Need Plenty of Potash
G-3-42 More Legumes for Ontario Mean More Cheese for Britain
H-3-42 Legumes Are Essential to Sound Agriculture
I-3-42 High-grade Fertilizers Are More Profitable
Q-5-42 Potash Extends the Life of Clover Stands
S-6-42 A Comparison of Boron Deficiency Symptoms and Potash Leafhopper Injury on Alfalfa
T-6-42 The Fertilization of Pastures and Legumes
Y-8-42 The Southeast Can Grow Clover and Alfalfa
AA-10-42 Growing Legumes for Nitrogen
DD-10-42 Clover Pastures for the Coastal Plains
FF-11-42 Boron in Agriculture
GG-11-42 Some Experiences in Applying Fertilizer
HH-11-42 The Nutrition of the Corn Plant
II-12-42 Wartime Contribution of the American Potash Industry
JJ-12-42 The Place of Boron in Growing Truck
A-1-43 The Salt That Nearly Lost a War
B-1-43 Crotalaria—A Crop That Grows Like Weeds
C-1-43 Quality in Grasses for Pasture and Hay
E-1-43 Borax for Alfalfa in Tennessee
F-1-43 Boron Improves Canning Beets
H-2-43 Plant Food for Peach Profits
J-2-43 Maintaining Fertility When Growing Peanuts
K-2-43 Feeding Minerals By Way of the Soil
M-3-43 Lespedeza Is Not A Poor Land Crop
N-3-43 Boron and Potash for Alfalfa in the Northeast
O-3-43 Indirect Nitrogen Fertilization
P-3-43 Ohio Farmers Try Plow-Under Fertilizers
S-4-43 Plow-Sole Fertilizers Benefit Tomatoes
T-4-43 Fertilizing Tung Trees by Leaf Analysis
V-4-43 Permanent Pastures Need Help
W-4-43 The Soil Is the Basis of Farming Business
X-5-43 Malnutrition Symptoms & Plant Tissue Tests of Vegetable Crops
Y-5-43 Value & Limitations of Methods of Diagnosing Plant Nutrient Needs
AA-5-43 Can Legumes Be Over-Emphasized?
BB-6-43 Sericea Is A Good Crop
CC-6-43 Putting Fertilizer Down Puts Crops Up
EE-8-43 Pastures—That Come to Stay
FF-8-43 Potash for Citrus Crops in California
HH-8-43 More Soybeans, Please!
JJ-10-43 Soil Management for Field Beans
KK-11-43 How Rotation Paid in North Carolina
LL-11-43 The Effect of Liming Materials Upon the Solubility of Potassium Compounds in the Soil
MM-11-43 Mississippi Farmers Improve Their Soil
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THE AMERICAN POTASH INSTITUTE
1155 16TH STREET, N. W. WASHINGTON 6, D. C.

SO MATTER-OF-FACT

The English are a phlegmatic race. Week-ending once with an Englishman and his wife, entirely by accident, an American happened one day on the Englishman's wife in her bath. Making a hurried retreat, the American immediately sought out his host who was reading in his room, and proffered an apology. The Englishman brought his head up from his book and regarded his guest for a minute.

"Skinny old thing, isn't she?" he remarked.

Filling out an application for dependents' aid, a soldier answered "no" to the question as to whether he had any dependents.

"You're married, aren't you?" an officer asked.

"Yessir," the soldier replied, "but she ain't dependable."

"I do not like these jackets,"
Said a Wave who was rather thin.
"But," said her friend, "you get out of them
Just exactly what you put in."

Mandy: "Ah can't come to work tomorrow, Mam. Mah little boy is sick."

Mam: "Why, Mandy, I thought you said you were an old maid."

Mandy: "Ah is, but ah ain't one of them fussy kind."

MAY LEARN HOW

"Congratulations, Old Top. Just heard about you and Alice. How long have you been engaged?"

"Two weeks."

"Have you kissed her yet?"

"No, but I think I could."

It happened in one of our larger stores during the rush hour. The elevator was jammed and the cables groaned. The elevator rose slowly, and as it neared the third floor a piercing scream caused the operator to stop the car midway. All eyes were focused on a large woman in a short, seal jacket, who wore an injured expression. A small boy, not yet of school age, stood directly behind her. "I did it," he announced truculently. "It was in my face, so I bit it."

ABBREVIATED

"And where is Cadet Smith?"

"A. W. O. L."

"What do you mean by that?"

"After women or liquor."

The father of the family is in the service and has been overseas for more than a year. His two small sons spend most of their time praying for a baby sister, and their mother can't talk them out of it.

The boys insist: "It would be such a big surprise for daddy when he comes home."

"Heredity," the little boy wrote, "means that if your father didn't have any children, and your grandfather didn't have any children, you won't have any children."

'Neath the spreading chestnut tree
The village smithy squirms;
He's been eating chestnuts
And they were full of worms!

Definition of a gentleman: A wolf with patience.

Need for—

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Outstanding results have been obtained with the application of Borax in specific quantities or as part of the regular fertilizer mix, improving the quality and increasing the production of alfalfa and other legumes, table beets, sugar beets, apples, etc.

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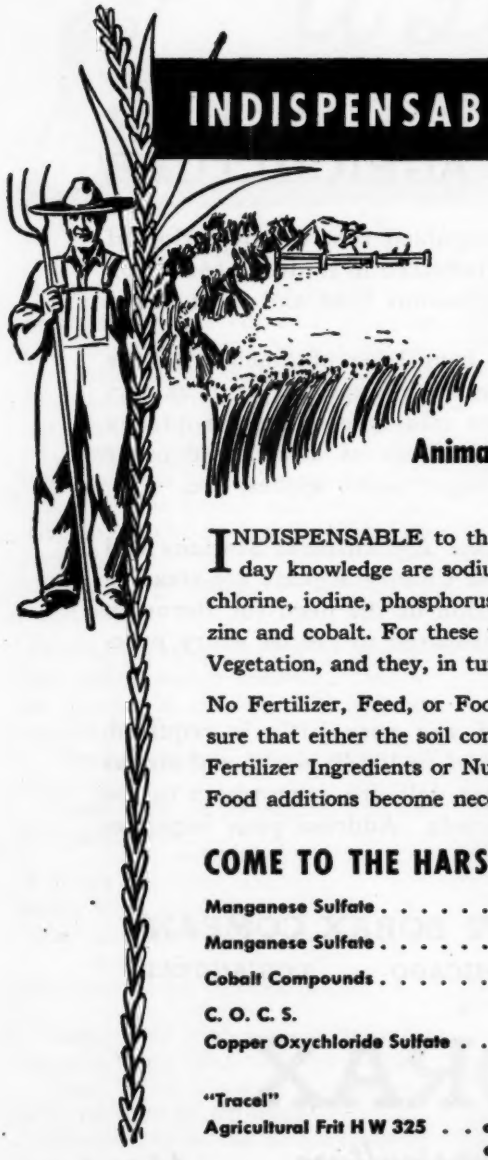

INDISPENSABLE TO ALL LIFE

37 Elements are associated in one way or another with the fabric of all life, Human, Animal, Vegetable or Micro-Organic

INDISPENSABLE to the Human diet according to present day knowledge are sodium, potassium, calcium, magnesium, chlorine, iodine, phosphorus, sulphur, iron, manganese, copper, zinc and cobalt. For these we depend on Animal Products and Vegetation, and they, in turn, depend on the soil.

No Fertilizer, Feed, or Food is complete without them. Make sure that either the soil contains them or has them supplied as Fertilizer Ingredients or Nutritional Sprays. Otherwise Feed or Food additions become necessary.

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